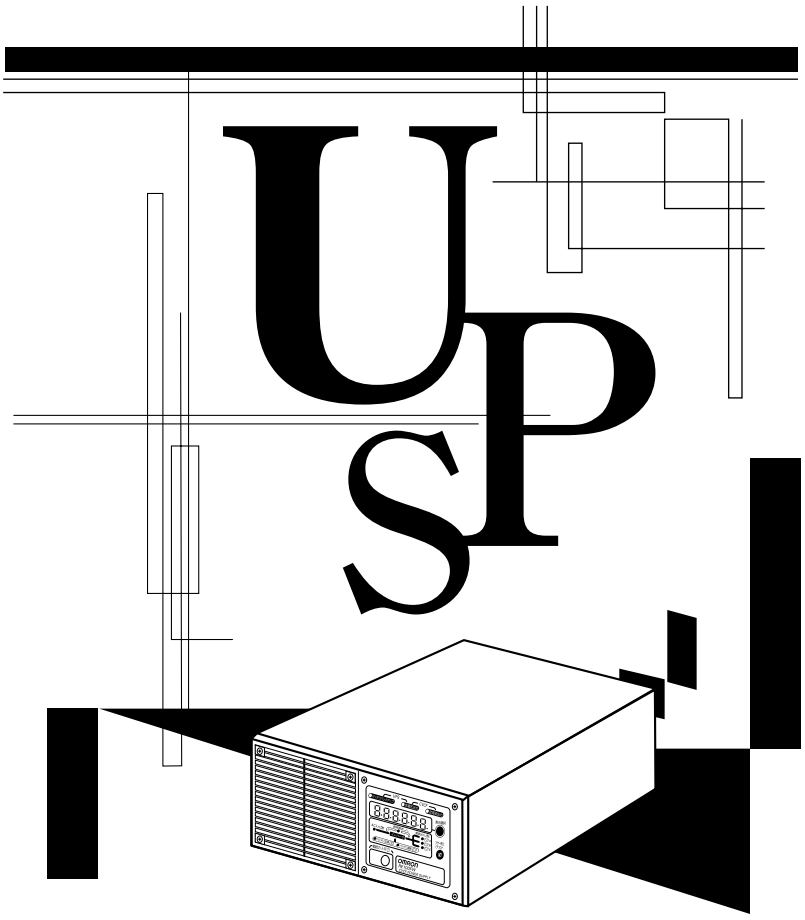
OMRON

POWLI

BH60PCW/BH100PCW
UPS

RE60FW/RE100FW
AC Stabilized Power Supply (CVCF)

Instruction Manual



- This manual contains important information regarding the safe use of the BH60PCW/BH100PCW/RE60FW/RE100FW. Please read these instructions before installation and/or use.
- Keep this manual in a convenient location near the BH60PCW/BH100PCW/RE60FW/RE100FW so that you can refer to it whenever necessary.

Introduction

Features of this product

Thank you for purchasing an OMRON Uninterruptible Power Supply (UPS).

- The UPS protects computers and other devices from power failures, voltage variations, instantaneous voltage drops, and surge voltage such as that caused by lightning (phenomena in which extraordinarily high voltage occurs instantaneously).
  The UPS (BH series) uses a full-time inverter supply method. Under normal conditions, commercial power is converted to direct current, and then it is converted back to a stable sinusoidal current before it is output. When a commercial power failure, voltage variation, or other problem is detected, the unit switches to battery supply to provide continuous sine wave output.
  This is especially suitable for use where power supply conditions are poor (for example, when there are large variations in voltage).
  The AC stabilized power supply (RE series) can stabilize the voltage and frequency before output, and can convert 50Hz to 60Hz (or 60Hz to 50Hz) before output.
- The output capacity is 600VA/420W for the BH60PCW/RE60FW, and 1kVA/700W for the BH100PCW/RE100FW.

Notes on using the UPS and AC stabilized power supply (CVCF)

- This product is designed and manufactured for use with OA equipment such as personal computers.
  Do not use this product when a very high degree of reliability and safety is required, such as in the following types of applications:
  - Medical equipment that supports life directly
  - Applications that may cause injury (applications that directly affect the operation and control of planes, ships, railroads, elevators, etc.)
  - Applications that are subject to constant vibration, such as in cars and ships
  - Applications in which failure may significantly damage or impact the society and public (Important computer systems or communication equipment, public transportation systems, etc.)
  - Other equipment with the same level of importance
- For equipment that greatly affects the safety of people and maintains public functions, special considerations related to operation, maintenance, and management, such as performing system duplication and emergency power generation facilities, must be taken.
- Observe the contents of this manual, particularly those concerning the operating conditions and environment.
- When you want to use this product for an important system that requires very high reliability, contact the Electronic Systems & Equipments customer support center at: _____.
- Do not modify/alter this product.
- This product is designed for use within Japan. Please contact us when incorporating this product into equipment for export.
  - Export of this product (including transport by an individual) may require the permission of the Ministry of Economy, Trade and Industry under the Foreign Exchange and Foreign Trade Law. Export of this product without the required permission is punishable under the law.
  - Injury or fire may result if the voltage or frequency is different.

Disclaimers

OMRON is not liable for any damage or secondary damage resulting from the use of this product, including the malfunction or failure of equipment, connected devices, or software.

- Make sure to read the safety precautions before using the unit.

- Windows is the registered trademark of Microsoft Corporation in the United States and/or other countries.
- The names of other companies and products mentioned herein are the trademarks or registered trademarks of their respective owners.
- Note on user registration
  Fill out the required items on the included user registration card, and send it to the OMRON Electronic Systems & Equipments customer support center.

Safety Standard Certification

The unit meets the safety standards described below.

- The UPS and battery unit (BH60PCW, BH100PCW, BHM60PC and BHM100PC) are UL (UL1778) certified products. The products also comply with CE standards.
- The AC stabilized power supply (RE60FW and RE100FW) does not meet safety standards as an AC stabilized power supply. However, it is the same as the UPS main unit (without the battery unit).

Product	Model	Certified safety standards
UPS	BH60PCW	c UL us LISTED 50BG U.P.S CE
	BH100PCW	
AC stabilized power supply	RE60FW	NONE
	RE100FW	NONE

Warning

This UPS conforms to Category C2.

Use of this device in a residential place may cause electromagnetic interference. In such case, the user may be required to take appropriate measures.

IMPORTANT SAFETY INSTRUCTION

1. SAVE THESE INSTRUCTIONS.

This manual contains important instructions for BH60PCW and BH100PCW that should be followed during installation and maintenance of the UPS and batteries.

2. SYMBOL


This symbol indicates earth ground.


This symbol indicates turning on UPS.


This symbol indicates turning off UPS.

3. INTERNAL BATTERY

Internal battery voltage is 24V DC for battery unit BHM60PC and BHM100PC.

4. TEMPERATURE RATING

The maximum ambient temperature of the UPS is 55°C.

5. ENVIRONMENT

The unit is intended for installation in a temperature controlled, indoor area free of conductive contaminants.

Procedure from installation to operation

The procedure from installation to operation is displayed below.

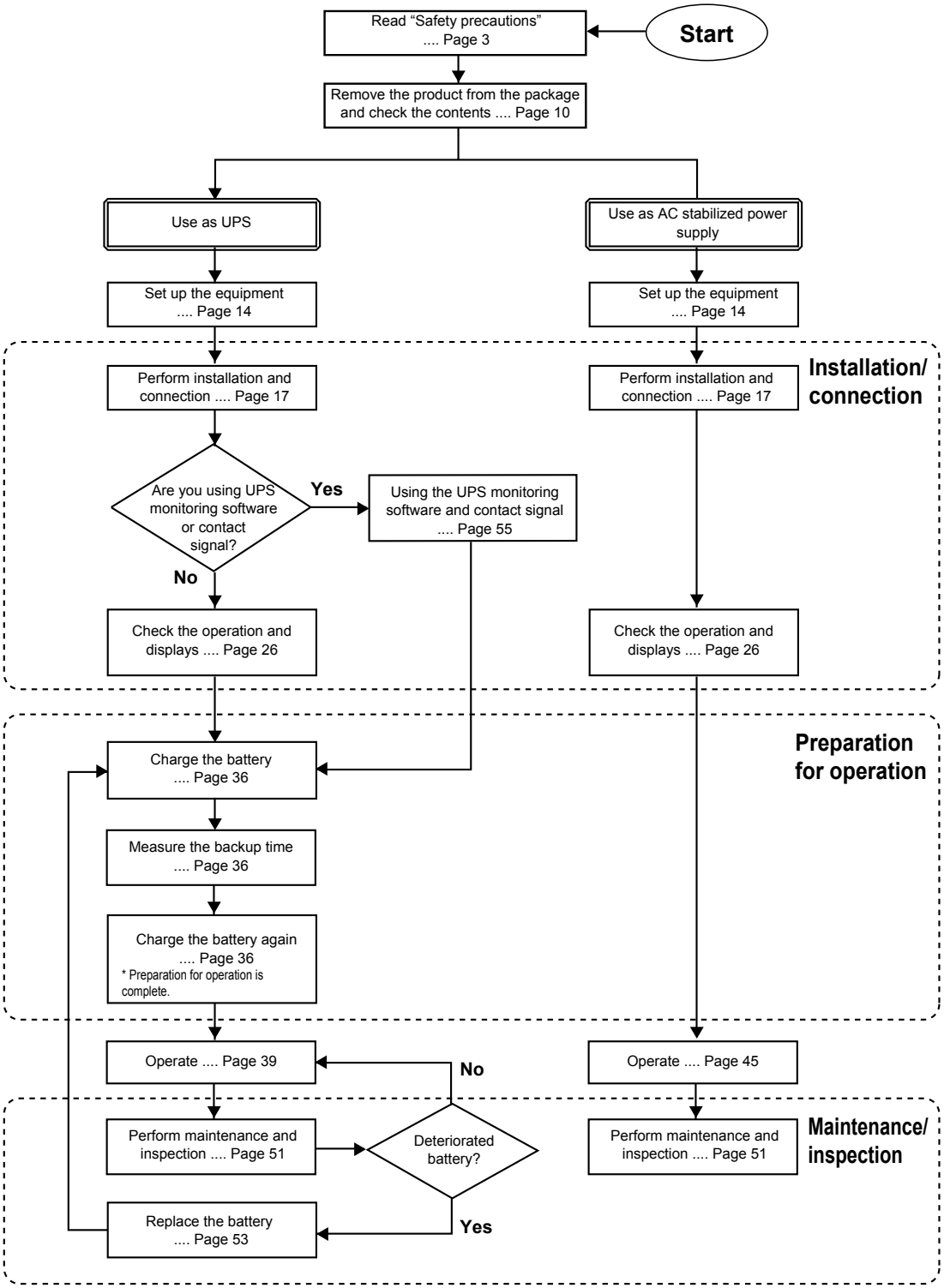


Table of Contents

Safety precautions

This manual contains important information regarding the safe use of this product.
Please read these instructions before installing or using the product.

The safety symbols used in this manual are explained below.

Warning	Indicates an imminently hazardous situation which, if not handled properly, may result in death or serious injury.
Caution	Indicates a potentially hazardous situation which, if not handled properly, may result in injury or property damage.

* Property damage means damage to houses/household effects, livestock, and pets.

: Indicates a prohibited action (something you must not do). For example, indicates that disassembly is prohibited.

: Indicates a necessary action (something you must do). For example, indicates that grounding is necessary.

Note that some items described as cautions may result in more serious damage under certain conditions. The information described here is very important and must be strictly observed.

Warning (product use)

Do not use this product in applications which require an extremely high degree of reliability and safety, such as those listed below.

*** This product is designed and manufactured for use with OA equipment such as personal computers.**

- Medical equipment or systems that support life directly
- Applications that directly affect the safety of people (for example, the operation and control of cars and elevators)
- Applications in which failure may significantly damage or impact the society and public (for example, important computer systems or communication equipment.)
- Applications with the same level of importance as those described above.

Warning

Do not try to disassemble, repair, or modify the product.

- Doing so may cause an electric shock or a fire.

Be careful of electric shock from output receptacles B and C! (Shock may occur when performing ON/OFF control with UPS monitoring software.)

- Output turns ON when the control circuit fails or stops.
  - When the receptacle output is stopped
  - When the receptacle output is stopped due to delay function

Caution (installation)

Consider the weight when carrying or unpacking the unit.
Place the unit on a level, stable and solid surface.

- Injury may result if the unit falls or is dropped.
- The weight of the unit is approximately:
  BH60PCW (RE60FW): 6.3kg BH100PCW (RE100FW): 6.6kg
  BHM60PC battery unit: 8.2kg BHM100PC battery unit: 10.3kg
- If you drop the unit, stop using it and have it inspected and repaired.

Keep plastic bags out of the reach of children.

- Children may suffocate if they put their heads into plastic bags.

⚠ Caution (installation)

Provide secure grounding of input and output.

- Connect the AC input plug of the unit directory to a 3P wall outlet (NEMA5-15).
- The neutral line (W) of a secondary (output) should be grounded, when AC source is supplied through a transformer.
- Connect AC input plugs of devices directory to 3P outlet of this unit (NEMA5-15).

Do not use the product where the ambient temperature exceeds 55ºC.

- The battery deteriorates rapidly.
- Doing so may cause the unit to fail or malfunction.

Do not exceed the ranges specified for environmental conditions during use/storage.
Do not install or store the unit in the types of places listed below.

- Do not store the unit in places where the humidity is lower than 10% or higher than 90%.
- Do not use the unit in places where the humidity is lower than 10% or higher than 90% (with no condensation).
- Do not install/store the unit in closed places such as cabinets with no clearance, places where there is flammable or corrosive gas, places exposed to vibration and/or sudden movement, or outdoors.
- Installing or storing the unit in such places may cause a fire.

Do not block the air vents on the front and side of the unit.
Do not use the product in a closed place and/or do not cover the product.

- Doing so may cause abnormal heating or a fire.
- Doing so will cause the internal temperature to rise, which may cause the unit to fail and the battery to deteriorate.
- Leave at least 5 cm of space between the vent and the wall.

Do not install the unit in any position other than those specified.
Do not install the unit on an unstable base.
Anchor the unit when it is used in a vertical position to prevent it from falling over.

- Refer to “3-2 Installation” .... on page 18 for proper installation positions.
- Injury may result if the unit falls or is dropped.

Do not place objects on the unit that are 25kg or heavier, and do not drop metal objects onto the unit.
Do not place objects on the unit (except other units when stacking).

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, and may cause a fire.

Do not pinch or tie the cable of the unit.

- Doing so may damage the cable or cause it to become hot, resulting in an electric shock or a fire.
- If the cable is damaged, immediately stop using the unit and have it repaired.

All of the included accessories are designed to be used exclusively with the unit. Do not use the accessories with other devices.

- Doing so may compromise the safety of devices.

When installing the unit on a rack, use support angles (sold separately) and mounting brackets to support and stabilize the unit.
When a battery unit is added, make sure to position the battery unit so that it is below the main unit.

- When installing the unit on a rack, use support angles (sold separately) and mounting brackets. The front mounting brackets are not able to support the weight of the unit without support angles.
- Weight of the unit is approximately: BH60PCW (RE60FW): 6.3kg BH100PCW (RE100FW): 6.6kg
  BHM60PC battery unit: 8.2kg BHM100PC battery unit: 10.3kg

When installing the unit on a rack, place it on the lowest shelf.

- Injury may result if the unit falls.

When using separately purchased brackets, make sure to use the mounting screws that were included.

- Mounting screws other than those included may not be strong enough to support the unit, causing it to fall.

⚠ Caution (connection)

Connect the unit to a wall outlet (commercial power) with a capacity higher than that of its maximum input current.

- Otherwise, the wiring of the unit may overheat.
- The maximum input currents when rated capacity devices are connected are:
  BH60PCW, RE60FW: 7A
  BH100PCW, RE100FW: 12A

Make sure to connect the unit's AC input plug to a wall outlet (commercial power) with rated input voltage (50/60Hz).

- Connecting to a wall outlet (commercial power) with a different voltage may result in a fire.
- Doing so may cause the unit to fail.

The socket-outlet for pluggable equipment shall be installed near the equipment and shall be easily accessible.

Do not connect equipment that exceeds the output capacity of the unit.
You can use a plug strip to connect additional devices, but do not connect devices that exceed the current capacity of the plug strip.

- The unit may detect an overload, which may stop the output.
- The power strip may overheat and cause a fire.

Do not connect devices (such as dryers) which have a half-wave rectifier that allows only half-cycle AC power to flow through.

- Doing so may cause the unit to fail.

Do not connect devices that cannot be used with commercial power supply.

- When the unit's power supply output switch is turned ON and an error occurs with a connected device, bypass operation is performed and commercial power supply is supplied directly to the connected devices.

⚠ Caution (use)

If liquid leaks from the battery, do not touch it.

- Doing so may cause blindness or burns.
- If the liquid touches your eyes or skin, wash it out with lots of clean water and consult your doctor.

If you notice an abnormal sound or smell, smoke or leaking fluid,

UPS case

Immediately turn OFF the UPS power output switch (⏻), and disconnect the AC input plug from the wall outlet (commercial power) and disconnect the battery connector (with Red and Black code) from the UPS rear panel.

CVCF/AVR case

Immediately turn OFF the unit's power output switch (⏻), and disconnect the AC input plug from the wall outlet (commercial power).

- Using the unit under such conditions may cause a ground fault or fire.
- If you notice such conditions, stop using the unit and contact us at _____ for inspection and repairs.
- Use the unit in such a way that you can immediately disconnect the AC input plug from the wall outlet (commercial power) in the event a problem occurs.

Do not place objects on the unit that are 25kg or heavier, and do not drop metal objects onto the unit.
Do not place objects on the unit (except other units when stacking).

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, and may cause a fire.

Do not use the product in a closed place and/or do not cover the product.

- Doing so may cause abnormal heating or a fire.

⚠ Caution (use)

Do not pour water on the unit and do not allow it to become wet.

- Doing so may cause an electric shock or a fire.
- If the unit becomes wet, immediately stop using it and have it inspected and repaired.

Do not insert metal objects into the unit's output receptacles.

- Doing so may cause an electric shock.

Never touch the metal part of the AC input plug if it is disconnected while the unit isoperating.

- Doing so may result in electric shock.
- The leak current of this product itself is less than the value of the safety standard (leak current: 1 mA). However, because connected equipment causes the leak current to increase, you must never touch the metal part of the AC input plug.
- When the unit is operating, voltage is generated in the metal parts of the AC input plug viacapacitors in the internal circuit, regardless of the elapsed time.

Periodically wipe the AC input plug clean of dirt with a dry cloth.

- Accumulated dust may cause a fire.

When the battery replacement lamp is blinking or when the backup time becomes shorter than the required time, immediately stop using the unit and replace the battery pack.

- Continuing to use the unit may cause a fire.

For more on how to check the battery, see "5. Maintenance and inspection" on page 51.

Ambient temperature	Expected lifespan
20℃	5 to 7years
30℃	3 to 4years
40℃	1 to 2years
50℃	0.7 to 1years

* The values in the table on the left reflect the expected life under standard conditions, andare not guaranteed values.

⚠ Caution (maintenance)

Do not try to disassemble, repair, or modify the product.

- Doing so may cause an electric shock or a fire.

If liquid leaks from the battery, do not touch it.

- Doing so may cause blindness or burns.
- If the liquid touches your eyes or skin, wash it out with lots of clean water and consult your doctor.

When maintaining connected equipment, turn OFF the unit's power output switch (⏻) and disconnect the AC input plug from the wall outlet (commercial power).

- Make sure the output voltage is stopped before performing maintenance.
- The backup function continues to supply power from the power output receptacles while the UPS is operating, even when the AC input plug is disconnected.
- Power output is supplied at the next scheduled operation start if a scheduled operation is set and the AC input plug is connected to a wall outlet (commercial power).

Do not insert metal objects into the battery connectors. Do not create a short between the battery connectors.

- Doing so may cause an electric shock.
- Doing so may cause a fire, battery explosion, or burns.

⚠ Caution (battery replacement)

Battery can be replaced while the unit is stopped only.

- When replacing the battery, stop the connected devices, turn off the power supply (UPS) output switch (⏻), and disconnect the AC input plug from the wall outlet.

When performing battery replacement, do not insert metal objects into the battery receptacles.

- Failure to do so may result in an electric shock or short-circuit.

Do not short the battery with metal objects.

- Doing so may result in burns or a fire.
- Some electrical energy remains inside the spent battery.

Do not put the battery into fire.

- The batteries may explode.

Replace batteries only with the same model and brand:

- Battery pack models: BHB60PC: For BHM60PC battery unit (BH60PCW).
  BHB100PC: For BHM100PC battery unit (BH100PCW).
- Manufacturer: OMRON Corporation.
- Using a battery other than that which is specified may cause a fire.

Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the instructions

Do not use a new battery and an old battery at the same time.

- The battery may weaken quickly or leak dilute sulfuric acid.

Do not drop the battery or expose it to strong impact.

- Doing so may cause the battery to leak dilute sulfuric acid.

Do not perform battery replacement in a place where there is flammable gas.

- A spark may occur when connecting the battery, resulting in a fire.

Perform replacement on a stable and flat surface.

- Carefully hold the battery with both hands so that you do not drop it.
- Dropping the battery may result in injury or burns due to leakage (acid).

If liquid leaks from the battery, do not touch it.

- Touching the liquid (dilute sulfuric acid) may cause blindness or burns.

Do not open or mutilate batteries.

- Released electrolyte is harmful to the skin and eyes. It may be toxic.

⚠ Caution (fan replacement)

When replacing the fan, you must follow the procedure below to stop the unit (UPS/AC stabilized power supply).

- Stop all connected devices.
- Turn OFF the unit's power output supply switch to stop the power supply output.
- Disconnect the AC input plug from the wall outlet (commercial power).

Note

When moving the unit from a cold place to a warm place, leave it for several hours beforeu sing it.

- If the unit is promptly turned ON after being moved to a warmer place, condensation may form inside the unit and cause it to fail.

Check system operation beforehand if the unit is used in combination with a device whose power supply frequency fluctuates widely, such as a personal electric generator.

- The unit automatically recognizes the input power frequency when input power is supplied. If the unit is connected when the input power frequency is not stable at the rated level, the unit may misidentify the power supply frequency and may fail to operate normally. (If the unit is in operation, changing from commercial power supply to another power supply source, such as generating equipment, will cause no problem.)

If the unit is used with an inductive device such as a coil or motor, check the operation beforehand.

- With some types of devices, the effect of inrush current may cause this unit to stop operating properly.

Do not short the output lines of the unit with each other, and to not short the output lines with the ground.

- Doing so may cause the unit to fail.

Do not perform a withstand voltage test.

- A withstand voltage test may damage the surge absorption element built into the power supply input circuit.
- When performing a withstand voltage test, disconnect the surge protection FG's ground wire from the ground terminal on the back of the unit. Make sure to connect the ground wire of the "surge protection FG" to the grounding terminal during use.

Do not connect a page printer (such as a laser printer) to the unit.

- The page printer has a large peak current, so an excess connection capacity or a power failure due to instantaneous voltage drop may be detected.
- The unit repeatedly switches between Commercial Power Mode and Battery Mode, shortening the life of the battery.

Take measures for handling unforeseen accidents, such as data backup and system redundancy.

- The output may stop when there is a circuit failure.

Installation/storage location

- Do not install or store the unit in a place exposed to direct sunlight. - Doing so may cause the unit to fail or malfunction. A rise in temperature may cause the built-in battery to deteriorate rapidly and become unusable.

Notes (UPS)

Charge the battery soon after purchasing the unit.

- If you do not use the unit for a long time after purchase, the battery performance may deteriorate and it may become unusable.
- The battery charges automatically once the AC input plug of the UPS is connected to a wall outlet (commercial power).

Charge the battery before storing the UPS.

- The battery discharges even when it not being used, and it goes into over discharge state if it is left for a long period of time. The backup time may become shorter or the battery may become unusable.
- The storable period of the built-in battery of the UPS is 6 months after being fully charged. (Storage temperature of 40ºC or less is recommended.)
- When storing the battery for more than 6 months, recharge the battery before 6 months has elapsed by connecting the AC input plug of the UPS to a commercial power wall outlet.
- Turn OFF the power supply output switch (⏻) of the UPS while it is in storage.

Do not connect the unit's AC input plug to a power output receptacle during Battery Mode.

- Doing so may cause the unit to fail.

Before stopping commercial power to the unit, turn OFF the unit's power supply output switch.

- The unit enters Battery Mode when commercial power is stopped. If you frequently use the unit in Battery Mode, the battery life may be significantly shortened.

This unit uses a lead acid battery.

- Lead acid batteries are a valuable recyclable resource. Please recycle.
  For information about recycling, please contact the Electronic Systems & Equipments repair center at: .

Explanation (UPS)

Usual operation

- You may either leave the power supply output switch of the unit ON (operation status) or turn it OFF each time when stopping the connected system. Choose whichever operation method is more convenient.
- The battery charges once the unit is connected to commercial power.

Quitting Battery Mode

- If a power failure lasts for an extended period of time, the battery discharges and power supply from the UPS stops. Shut down your computer after performing appropriate procedures (for example, saving data) while the UPS is still supplying power.

Rebooting

- If the battery discharges completely during a power failure, the UPS stops. After recovery from the power failure, the UPS automatically restarts and supplies power. If you do not want the devices connected to the UPS to start up, turn OFF their power switches.
- The automatic restart setting can be disabled with the setting switch on the back of the unit.

Scheduled operation using the UPS monitoring software

- When scheduled operation is used and commercial power supply input is stopped during a scheduled stop period, specify a period of no more than 1 month for the start of the next operation.
  During period that commercial power input is stopped, the timer runs on internal battery power.
  If the timer stops, the operation does not start according to schedule.

Operation start using the UPS monitoring software during scheduled stop

- If the UPS starts operation during a scheduled stop period, turn OFF the power supply output switch once, and then turn it back on again.
  You can start the UPS manually. The schedule is reset once the power supply output switch is turned OFF.

1. Preparation

1-1 Unpacking the product

⚠ Caution (installation and connection)

The weight of the unit is:

- BH60PCW unit (RE60FW): 6.3kg
- BH60PCW unit (RE60FW): 6.6kg
- BHM60PC: 8.2kg
- BHM100PC: 10.3kg

Carefully consider the weight when unpacking/transporting this product.

- Injury may result if the unit falls.

Do not install the unit on an unstable base.

- Injury may result if the unit falls or is dropped.

Open the package and take out the unit (UPS) and accessories.

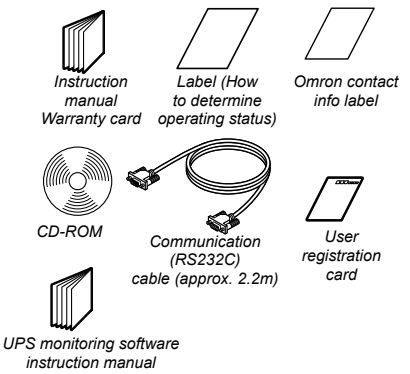
1-2 Checking the accessories

Make sure that all accessories are included and that there is no external damage.
If you notice any defects, immediately contact the shop of purchase.

• UPS: BH60PCW/BH100PCW

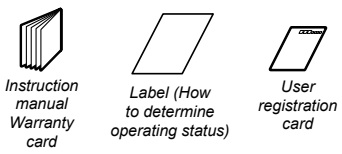
(1) Instruction manual 1
(2) Label (How to determine operating status 1
(3) Omron contact info label 1
(4) Auto shutdown software CD-ROM (with RS232C communication cable) 1
(5) UPS monitoring software instruction manual 1
(6) Warrant 1
(7) User registration card 1

- Battery unit (BHM60PC/BHM100PC) is included in a separate box with the UPS.



• AC stabilized power supply: RE60FW/RE100FW

(1) Instruction manual 1
(2) Label (How to determine operating status) 1
(3) Omron contact info label 1
(4) Warranty 1
(5) User registration card 1

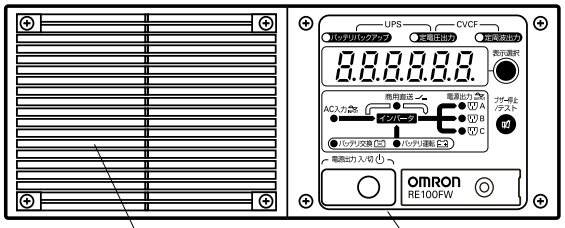


1-3 Part names

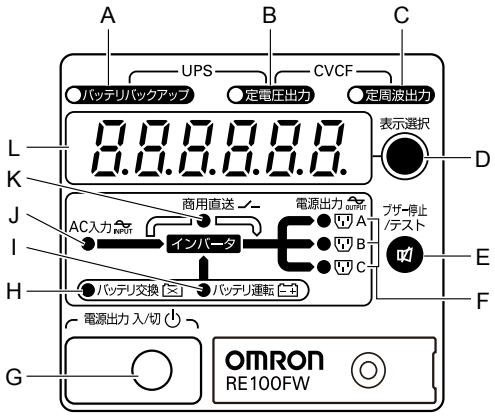
For more information on the function of each part, refer to “3. Installation and connection”on page 17 and “4. Operation” on page 37.

• Front view

UPS <BH60PCW/BH100PCW>
AC stabilized power supply <RE60FW/RE100FW>

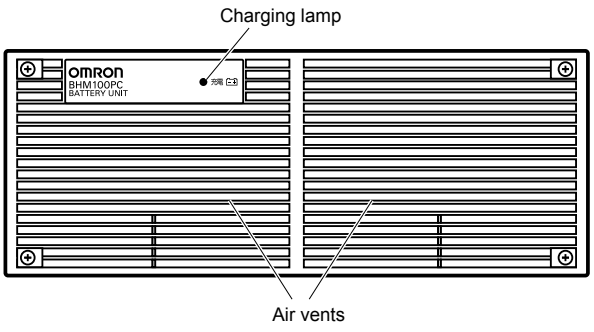


<Enlarged view of operation panel>



A. Battery backup lamp
B. Constant voltage output lamp
C. Constant frequency lamp
D. Indicator selection switch
E. Beep stop/test switch
F. Power supply output A lamp
Power supply output B lamp
Power supply output C lamp
G. Power supply output switch
H. Battery replacement lamp
I. Battery Mode lamp
J. AC input lamp
K. Bypass lamp
L. Status indicator digital display

Battery unit <BHM60PC/BHM100PC>

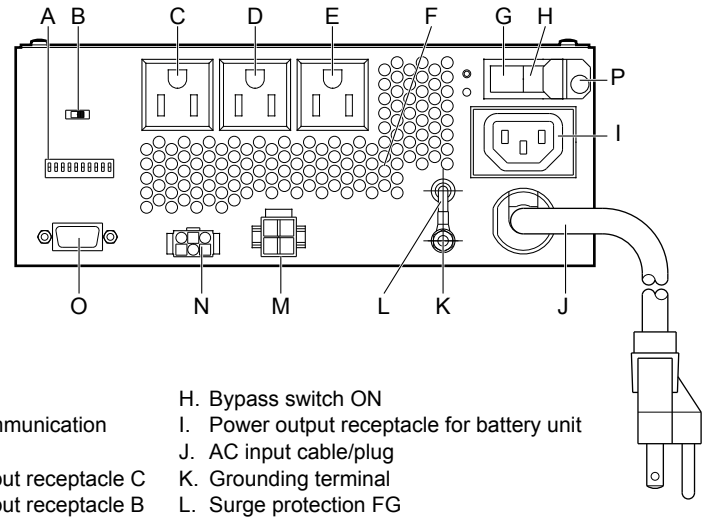


1-4 Explanation of symbols used on unit

Symbol	Description
	Start the UPS.
	Stop the UPS.
	Suspend a beep.
	UPS output power enabled, supplied by operating on line mode, battery mode.
	Bypass output “ON”.
	UPS operating on battery mode.
	Batteries at end of useful life, necessary to replace the batteries.

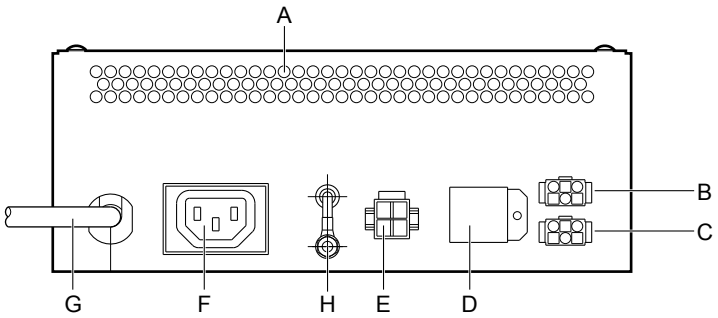
Rear view

UPS <BH60PCW/BH100PCW>
AC stabilized power supply <RE60FW/RE100FW>



A. Setting switch
B. Contact/serial communication selection switch
C. Power supply output receptacle C
D. Power supply output receptacle B
E. Power supply output receptacle A
F. Air vent
G. Bypass switch OFF
H. Bypass switch ON
I. Power output receptacle for battery unit
J. AC input cable/plug
K. Grounding terminal
L. Surge protection FG
M. Battery connector
N. Battery unit signal connector
O. Communication interface (D-sub 9-pin) connector
P. Fixing bracket

Battery unit <BHM60PC/BHM100PC>

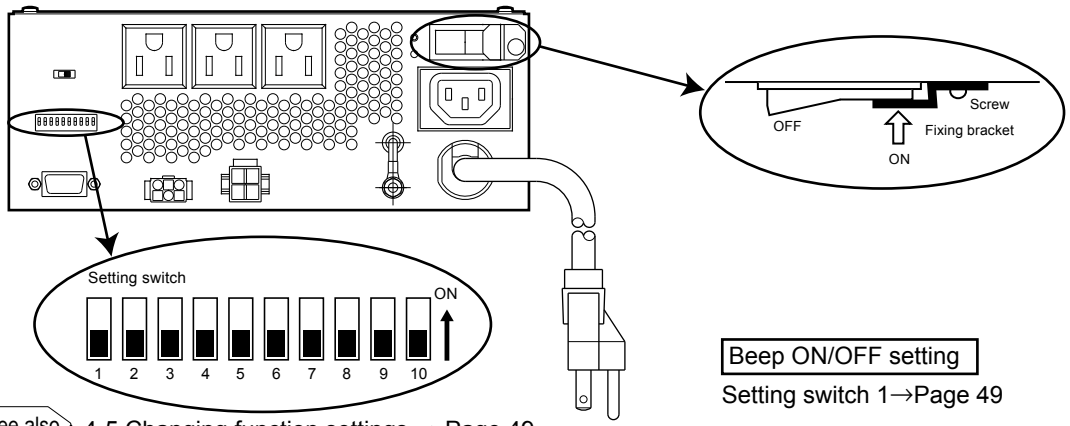


A. Air vent
B. Battery unit signal connector
C. Additional battery unit signal connector (BHM100PC only)
D. Additional battery connector (BHM100PC only)
* The unit ships with a connector cover.
E. Battery connector
F. Power output receptacle for battery unit (BHM100PC only)
G. AC input cable/plug
H. Surge protection FG

2. Preparing for installation

⚠ Caution (Make sure to perform the settings below before installation.)

- **Lock the bypass switch with the bracket. After making the settings, use the bracket and screw to lock the switch as shown in the diagram.**
- **Set the setting switch and bypass switch on the back of the unit according to the type of usage, as shown below.**



Beep ON/OFF setting
Setting switch 1→Page 49

See also 4-5 Changing function settings → Page 49

2-1 Settings for use as uninterruptible power supply (UPS)

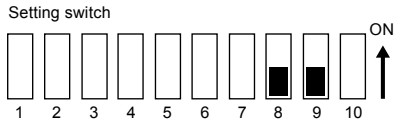
(1) Constant voltage input/output synchronization operation

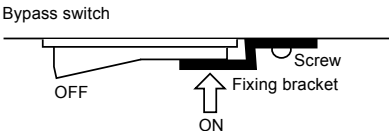
(Normal usage, where output frequency is synchronized with input frequency before output)

Battery unit connection		Available
Setting switch selection	SW8 Cold start	OFF
	SW9: Synchronized/ Non-synchronized selection	OFF
	SW10 50/60Hz selection	OFF/ON

Bypass switch	ON

Make sure the bypass switch is set to ON. If it is OFF and overload or failure occurs, the output stops and direct output cannot be performed.





Next 3. Installation and connection → Page 17

UPS

(2) Constant voltage/constant frequency output (frequency conversion) operation

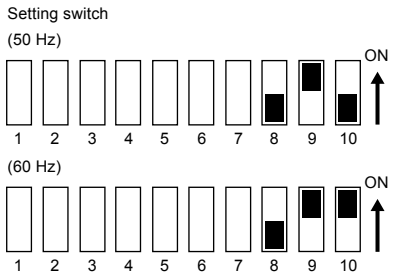
(Usage in which output has a constant frequency that is not synchronized with input frequency)

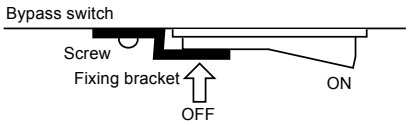
- Use this setting only when you want to stabilize the output frequency, or when you want to output at a frequency different from the input frequency.

Output frequency		50Hz output	60Hz output
Battery unit connection		Available	Available
Setting switch selection	SW8 Cold start	OFF	OFF
	SW9: Synchronized/Non-synchronized selection	ON	ON
	SW10 50/60Hz selection	OFF	ON

Bypass switch	OFF

The bypass switch cannot be used during operation when this setting is used.
Turn OFF the bypass switch.
Direct output is not performed when a failure or overload occurs.





Next 3. Installation and connection → Page 17

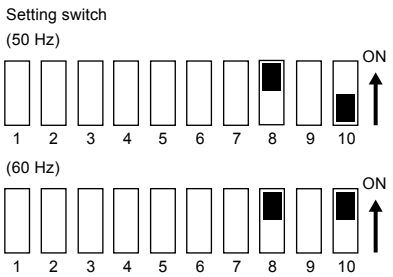
2-2 Settings for use with cold start

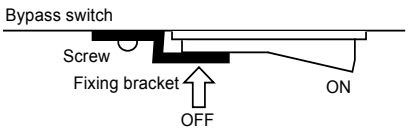
Output starts up with no commercial input, and it operates on battery power supply.

Output frequency		50Hz output	60Hz output
Commercial power input		None	None
Battery unit connection		Available	Available
Setting switch selection	SW8: Battery startup	ON	ON
	SW9: Synchronized/Non-synchronized selection	ON/OFF	ON/OFF
	SW10 50/60Hz selection	OFF	ON

Bypass switch	OFF

The bypass switch cannot be used during operation when this setting is used.
Turn OFF the bypass switch.
Direct output is not performed when a failure or overload occurs.





Next 3. Installation and connection → Page 17

2-3 Settings for use as AC stabilized power supply (CVCF, AVR)

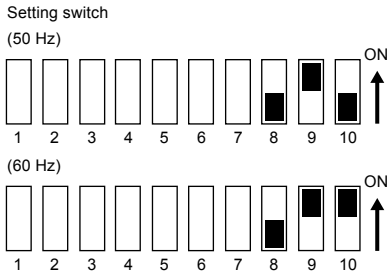
(1) Constant voltage/constant frequency (frequency conversion) operation (CVCF)

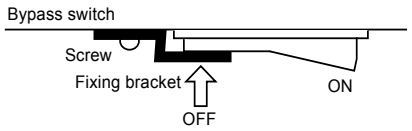
(Usage in which output has a constant frequency that is not synchronized with input frequency)

Output frequency		50Hz output	60Hz output
Battery unit connection		None	None
Setting switch selection	SW8 Cold start	OFF	OFF
	SW9: Synchronized/ Non-synchronized selection	ON	ON
	SW10 50/60Hz selection	OFF	ON

Bypass switch	OFF

The bypass switch cannot be used during operation when this setting is used.
Turn OFF the bypass switch.
Direct output is not performed when a failure or overload occurs.





Next 3. Installation and connection → Page 17

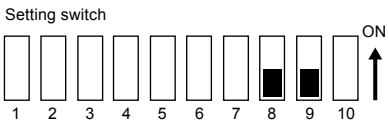
(2) Constant voltage/input synchronization operation (AVR)

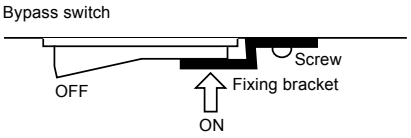
(Usage in which output voltage is stabilized and output frequency is synchronized with input frequency before output)

Battery unit connection		None
Setting switch selection	SW8 Cold start	OFF
	SW9: Synchronized/ Non-synchronized selection	OFF
	SW10 50/60Hz selection	ON/OFF

Make sure the bypass switch is set to ON. If it is OFF and overload or failure occurs, the output stops and direct output cannot be performed.

Bypass switch	ON





Next 3. Installation and connection → Page 17

3. Installation and connection

3-1 Precautions and notes for installation and connection

Precautions and notes for installation and connection are described below. Read and follow the instructions.

⚠ Warning

Do not try to disassemble, repair, or modify the product.

- Doing so may cause an electric shock or a fire.

Be careful of electric shock from output receptacles B and C! (Shock may occur whenperforming ON/OFF control with UPS monitoring software.)

- Output turns ON when the control circuit fails or stops.
  - When the receptacle output is stopped
  - When the receptacle output is stopped due to delay function

⚠ Caution (installation)

Consider the weight when carrying or unpacking the unit.
Place the unit on a level, stable and solid surface.

- Injury may result if the unit falls or is dropped.
- The weight of the unit is approximately:
  BH60PCW (RE60FW): 6.3kg BH100PCW (RE100FW): 6.6kg
  BHM60PC battery unit: 8.2kg BHM100PC battery unit: 10.3kg
- If you drop the unit, stop using it and have it inspected and repaired.

Keep plastic bags out of the reach of children.

- Children may suffocate if they put their heads into plastic bags. Provide secure grounding.

Provide secure grounding of input and output.

- Connect the AC input plug of the unit directory to a 3P wall outlet (NEMA5-15).
- The neutral line (W) of a secondary (output) should be grounded, when AC source is supplied through a transformer.
- Connect AC input plugs of devices directory to 3P outlet of this unit (NEMA5-15).

Do not use the product where the ambient temperature exceeds 55ºC.

- The battery deteriorates rapidly.
- Doing so may cause the unit to fail or malfunction.

Do not exceed the ranges specified for environmental conditions during use/ storage.
Do not install or store the unit in the types of places listed below.

- Do not store the unit in places where the humidity is lower than 10% or higher than 90%.
- Do not use the unit in places where the humidity is lower than 10% or higher than 90% (with no condensation).
- Do not install/store the unit in closed places such as cabinets with no clearance, places where there is flammable or corrosive gas, places exposed to vibration and/or sudden movement, or outdoors.
- Installing or storing the unit in such places may cause a fire.

Do not block the air vents on the front and side of the unit.
Do not use the product in a closed place and/or do not cover the product.

- Doing so may cause abnormal heating or a fire.
- Doing so will cause the internal temperature to rise, which may cause the unit to fail and the battery to deteriorate.
- Leave at least 5 cm of space between the vent and the wall.

⚠ Caution (installation)

Do not install the unit in any position other than those specified.
Do not install the unit on an unstable base.
Anchor the unit when it is used in a vertical position to prevent it from falling over.

- Refer to “3-2 Installation” .... on page 20 for proper installation positions.
- Injury may result if the unit falls or is dropped.

Do not place objects on the unit that are 25kg or heavier, and do not drop metal objects onto the unit.
Do not place objects on the unit (except other units when stacking).

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, and may cause a fire.

Do not pinch or tie the cable of the unit.

- Doing so may damage the cable or cause it to become hot, resulting in an electric shock or a fire.
- If the cable is damaged, immediately stop using the unit and have it repaired.

All of the included accessories are designed to be used exclusively with the unit. Do not use the accessories with other devices.

- Doing so may compromise the safety of devices.

When installing the unit on a rack, use support angles (sold separately) and mounting brackets to support and stabilize the unit.
When a battery unit is added, make sure to position the battery unit so that it is below the main unit.

- When installing the unit on a rack, use support angles (sold separately) and mounting brackets. The front mounting brackets are not able to support the weight of the unit without support angles.
- Weight of the unit is approximately: BH60PCW (RE60FW): 6.3kg BH100PCW (RE100FW): 6.6kg
  BHM60PC battery unit: 8.2kg BHM100PC battery unit: 10.3kg

When installing the unit on a rack, place it on the lowest shelf.

- Injury may result if the unit falls.

When using separately purchased brackets, make sure to use the mounting screws that were included.

- Mounting screws other than those included may not be strong enough to support the unit, causing it to fall.

⚠ Caution (connection)

Connect the unit to a wall outlet (commercial power) with a capacity higher than that of its maximum input current.

- Otherwise, the wiring of the unit may overheat.
- The maximum input currents when rated capacity devices are connected are:
  BH60PCW, RE60FW: 7A
  BH100PCW, RE100FW: 12A

Make sure to connect the unit’s AC input plug to a wall outlet (commercial power) with rated input voltage (50/60Hz).

- Connecting to a wall outlet (commercial power) with a different voltage may result in a fire.
- Doing so may cause the unit to fail.

The socket-outlet for pluggable equipment shall be installed near the equipment and shall be easily accessible.

Do not connect equipment that exceeds the output capacity of the unit.
You can use a plug strip to connect additional devices, but do not connect devices that exceed the current capacity of the plug strip.

- The unit may detect an overload, which may stop the output.
- The power strip may overheat and cause a fire.

⚠ Caution (connection)

Do not connect devices (such as dryers) which have a half-wave rectifier that allows only half-cycle AC power to flow through.

- Doing so may cause the unit to fail.

Do not connect devices that cannot be used with commercial power supply.

- When the unit's power supply output switch is turned ON and an error occurs with a connected device, bypass operation is performed and commercial power supply is supplied directly to the connected devices.

Note

When moving the unit from a cold place to a warm place, leave it for several hours beforeu sing it.

- If the unit is promptly turned ON after being moved to a warmer place, condensation may form inside the unit and cause it to fail.

Check system operation beforehand if the unit is used in combination with a device whose power supply frequency fluctuates widely, such as a personal electric generator.

- The unit automatically recognizes the input power frequency when input power is supplied. If the unit is connected when the input power frequency is not stable at the rated level, the unit may misidentify the power supply frequency and may fail to operate normally. (If the unit is in operation, changing from commercial power supply to another power supply source, such as generating equipment, will cause no problem.)

If the unit is used with an inductive device such as a coil or motor, check the operation beforehand.

- With some types of devices, the effect of inrush current may cause this unit to stop operating properly.

Do not short the output lines of the unit with each other, and to not short the output lines with the ground.

- Doing so may cause the unit to fail.

Do not perform a withstand voltage test.

- A withstand voltage test may damage the surge absorption element built into the power supply input circuit.
- When performing a withstand voltage test, disconnect the surge protection FG's ground wire from the ground terminal on the back of the unit. Make sure to connect the ground wire of the "surge protection FG" to the grounding terminal during use.

Do not connect a page printer (such as a laser printer) to the unit.

- The page printer has a large peak current, so an excess connection capacity or a power failure due to instantaneous voltage drop may be detected.
- The unit repeatedly switches between Commercial Power Mode and Battery Mode, shortening the life of the battery.

Take measures for handling unforeseen accidents, such as data backup and system redundancy.

- The output may stop when there is a circuit failure.

Notes (UPS)

Charge the battery soon after purchasing the unit.

- If you do not use the unit for a long time after purchase, the battery performance may deteriorate and it may become unusable.
- The battery charges automatically once the AC input plug of the UPS is connected to a wall outlet (commercial power).

Charge the battery before storing the UPS.

- The battery discharges even when it not being used, and it goes into over discharge state if it is left for a long period of time. The backup time may become shorter or the battery may become unusable.
- The storable period of the built-in battery of the UPS is 6 months after being fully charged. (Storage temperature of 40ºC or less is recommended.)
- When storing the battery for more than 6 months, recharge the battery before 6 months has elapsed by connecting the AC input plug of the UPS to a commercial power wall outlet.
- Turn OFF the power supply output switch (⏻) of the UPS while it is in storage.

3-2 Installation

Note
Before installing this device, make a record of the serial number. The serial number is required when contacting us about the device. The serial number is printed on the unit's label.

The unit can be installed in any of the positions shown below. Choose the installation position most suitable for your environment.

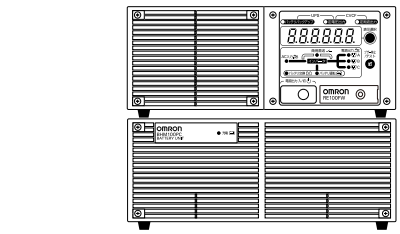
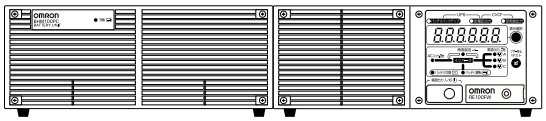
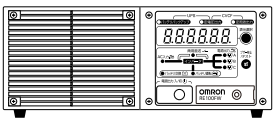
1. Stationary installation

• Horizontal

Attach the included rubber feet.

⚠ When using without the rubber feet attached, be careful not to pinch your fingers.

○ Correct positions

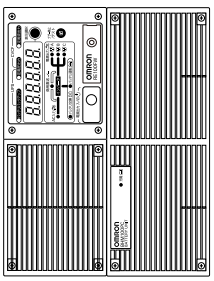
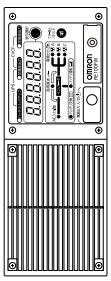
UPS	AC stabilized power supply (CVCF, AVR)
 Battery unit  Battery unit AC stabilized power supply	

• Vertical

Position it so that the right side (when facing the front of the unit) is facing upward.

⚠ Anchor the unit to prevent it from falling over.

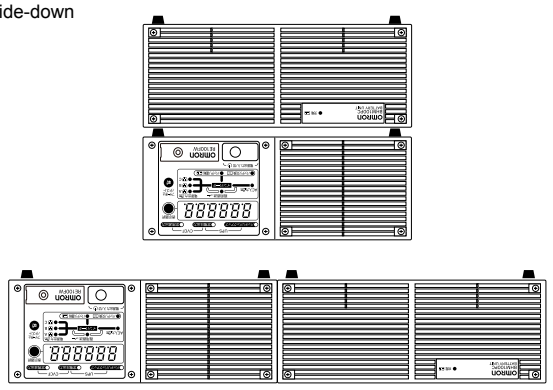
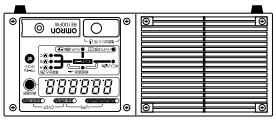
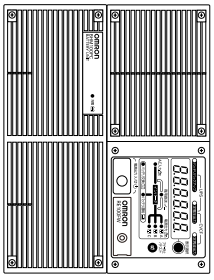
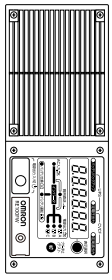
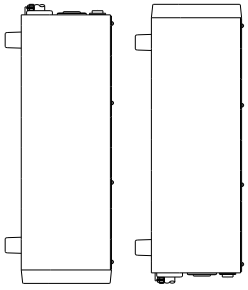
○ Correct positions

UPS	AC stabilized power supply (CVCF, AVR)
 Battery unit	

⚠ Caution (installation and connection)

The battery is positioned upside-down when the left side is facing downward, which maycause a reduction in performance, battery deterioration, leakage, etc.

✕ Incorrect positions

UPS	AC stabilized power supply (CVCF, AVR)
Upside-down 	Upside-down 
Right side is facing downward 	Right side is facing downward 
Front/rear side is facing up/down 	

3. Installation and connection

⚠ Caution

When installing the unit on an EIA 19-inch rack, use both BHP60P mounting brackets and BUP06 support angles (both sold separately) to support and stabilize the unit.

- When installing the unit on a rack, make sure to use mounting brackets and support angles (both sold separately). The front mounting brackets are not able to support the weight of the unit without support angles.

When installing the unit on a JIS 19-inch rack, use both BHP60J mounting brackets and a rack shelf (base plate) (both sold separately) to support and stabilize the unit.

- When installing the unit on a rack, use mounting brackets and a rack shelf (both sold separately). The front mounting brackets are not able to support the weight of the unit without the rack shelf (base plate).
- The weight of the unit is approximately:
  BH60PCW (RE60FW): 6.3kg BH100PCW (RE100FW): 6.6kg
  BHM60PC battery unit: 8.2kg BHM100PC: 10.3kg

When installing the unit on a rack, place it on the lowest shelf.

- Injury may result if the unit falls.

Make sure to use the mounting screws included with the brackets.

- Mounting screws other than those included may not be strong enough to support the unit, causing it to fall.

When using support angles or the rack shelf, do not stack multiple UPS or additional battery units on top of each other.

- Use a separate set of support angles or rack shelf for each connected unit.

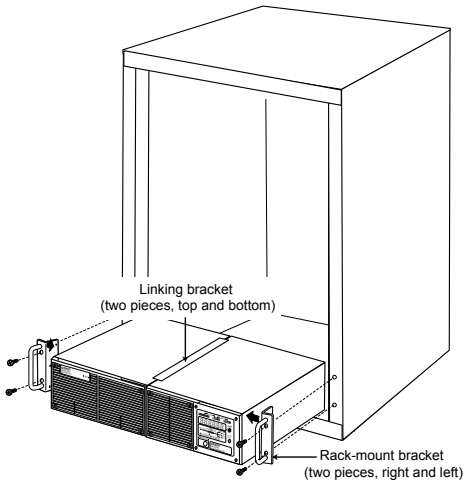
- When attaching to a rack, detach the rubber feet from the bottom surface of the unit.

When using an EIA 19-inch rack

- When attaching to the rack, use BHP60P mounting brackets (sold separately) to connect the UPS body with the battery unit. For details, refer to the instruction manual included with the rack-mount brackets (BHP60P) and support angles (BUP06).

When using a JIS 19-inch rack

- When attaching to the rack, use BHP60J mounting brackets (sold separately) to connect the UPS body with the battery unit.
  BUP06 support angles are not compatible with JIS standards. Use a rack shelf.
  For details, refer to the instruction manual included with the rack-mount brackets (BHP60J).
  For details, refer to the instruction manual included with the rack-mount brackets (BHP60P) and support angles (BUP06). Support angles are not compatible. Use a server rack.



Precautions when adding a battery unit:
When there is an odd number of UPS and battery units, they cannot be mounted on a rack. Two units need to be connected when mounting on a rack.

3-3 Connection

- When using the included “PowerAct PRO” UPS monitoring software and Windows standard UPS service, or when using contact signal input/output, refer to “6. Using the UPS monitoring software and contact signal” on page 55.

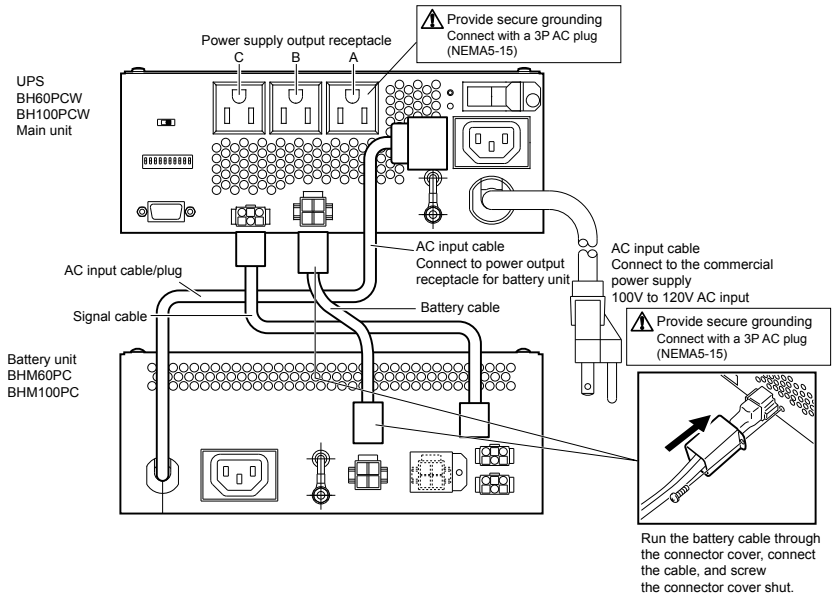
UPS

1. Connection when using as uninterruptible power supply (UPS)

Connect the UPS (BH60PCW/BH100PCW) and battery unit (BHM60PC/BHM100PC) as shown in the diagram below. A connection cable and connector cover are included with the battery unit. Refer to the battery unit instruction manual for more details.

⚠ Caution (installation and connection)

Check the bypass switch setting. (Refer to “2. Preparing for installation” Page 14)



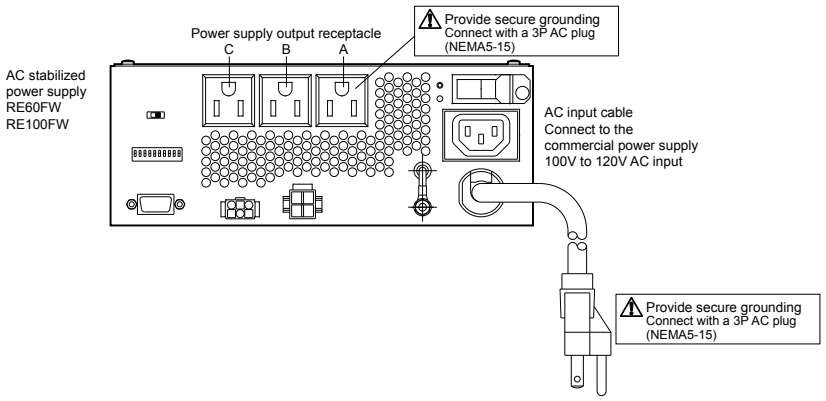
CVCF • AVR

2. Connection when using as AC stabilized power supply (CVCF, AVR)

Battery unit is not required.

⚠ Caution (installation and connection)

Check the bypass switch setting. (Refer to “2. Preparing for installation” Page 14)



3. Device connection procedure

• Connecting a device to the output receptacle

⚠ Make sure that the total capacity of devices connected to output receptacle does not exceed the output capacity rating of the BH60PCW (RE60FW)/BH100PCW (RE100FW).

⚠ If an overload is indicated, reduce the number of connected devices.

- The output current capacity varies according to the output voltage setting value, as shown below.

Output receptacles	Output capacity (VA)		Number of receptacles
	BH60PCW (RE60FW)	BH100PCW (RE100FW)	
Power supply output receptacle A	600VA	1kVA	1
Power supply output receptacle B	600VA	1kVA	1
Power supply output receptacle C	600VA	1kVA	1
Max. rated value of output capacity (Total value of output receptacles A, B, and C)	600VA/420W	1kVA/700W	
• For 100V output voltage	Max. 6A	Max. 10A	
• For 110V output voltage	Max. 5.5A	Max. 9.1A	
• For 115V output voltage	Max. 5.2A	Max. 8.7A	
• For 120V output voltage	Max. 5A	Max. 8.3A	

• Group control of power supply output receptacles

This function can be used with the UPS monitoring software included with the UPS.
The output receptacles of the BH60PCW/BH100PCW are separated into 3 groups: A, B, and C.

1. Power supply output receptacle A
   Output begins at the same time as startup.

2. Power supply output receptacles B, C
   - The output start times for power supply output receptacles B and C are independent of power supply output receptacle A, so they can be delayed or set to precede the output stop time.
   - The output start/stop time control function is only available when using the included “PowerAct PRO” UPS monitoring software.
   - Output ON/OFF can be controlled with the included UPS monitoring software while the BH60PCW/BH100PCW is operating.
   - The delay settings and ON/OFF control described here can be performed independently for power supply output receptacle B and power supply output receptacle C.
     This function can be used to set the startup order of servers, peripheral devices, etc.
     ON/OFF control of connected devices can be performed remotely.

⚠ Warning

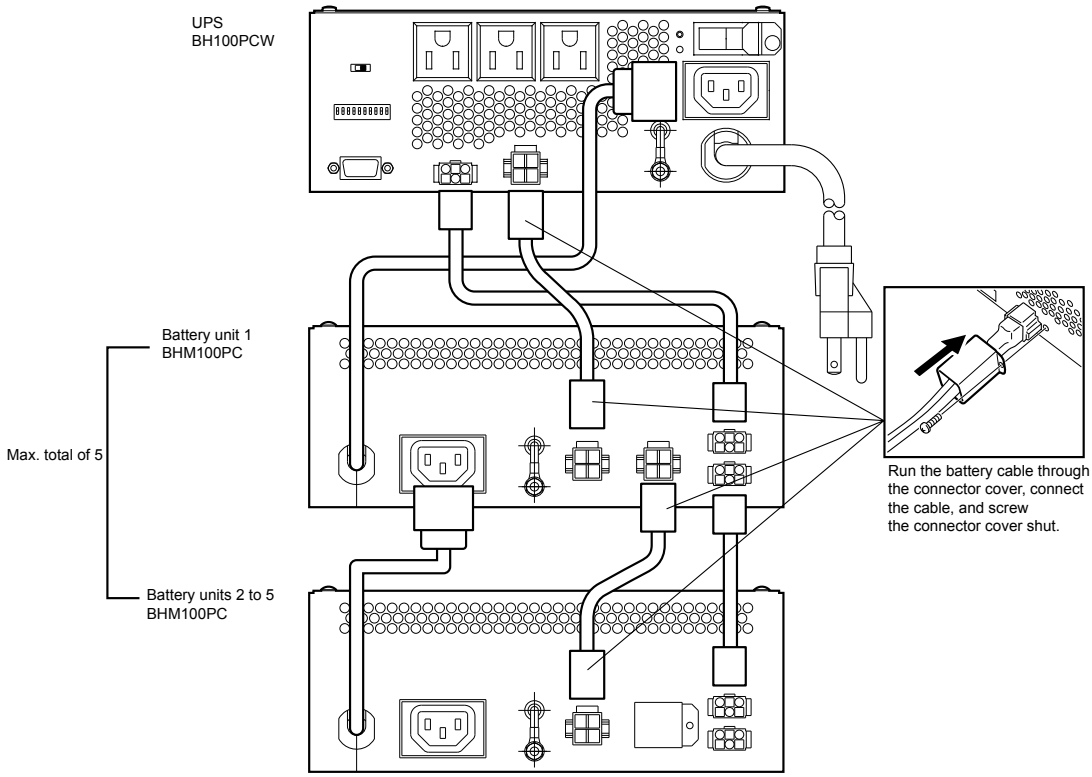
Be careful of electric shock from output receptacles B and C! (Shock may occur whenperforming ON/OFF control with UPS monitoring software.)

● While output receptacle A is outputting, outputs B and C turn ON when the control circuit fails or stops.
- While receptacle outputs B and C are stopped
- While receptacle outputs B and C are stopped due to delay function

3-4 Extending the UPS backup time

(Adding a battery unit)

- Up to 5 battery units can be connected to the 1kVA-type BH100PCW.
  * When using the unit in compliance with UL standards, a total of up to 2 battery units can be connected. Do not connect more than 3 units.
- The additional battery unit also uses the same type model of BHM100PC (for 1kVA) as the first unit.



* When adding a BHM100PC to a BHM100PC, remove the connector cover attached at shipment and connect the cable.

- Each battery unit is equipped with a charging circuit.
  The charging time does not increase when a battery unit is added.

3-5 Checking the operation

See also "2. Preparing for installation" page 14

1. Operation check when using as uninterruptible power supply (UPS)

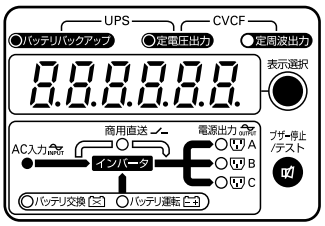
When you finish connecting devices to the unit, follow the procedure below to check that Battery Mode works properly. (In this operation check, the AC input plug is disconnected from the wall outlet (commercial power) to reproduce the effects of a power failure.)

UPS

1-1. When using input synchronization operation

(1) After connecting devices such as a PC to the UPS, connect the AC input plug of the UPS to a wall outlet (commercial power).

- The indicator appears as shown below when the AC input plug is connected.



● ON ○ OFF

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: OFF

- Functions that have been set are displayed.

U1 888	Input voltage (V) is displayed.

AC input	: ON

Battery unit charging display	: ON

- Just after the input power supply is turned ON, the status indicator turns ON and displays the details of the error that occurred most recently.
  When there is no record of error, the following is displayed: - -
- Next, the input voltage value is displayed.
  When the indicator blinks, the input voltage value is outside the startup range, so it does not operate when the power supply output switch is turned ON.

(2) Turn ON the unit°«s power supply output switch.

- The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
- Output begins with bypass.
- The bypass indication lamp turns OFF and inverter output starts.

  Bypass: ON, Power supply output: ON

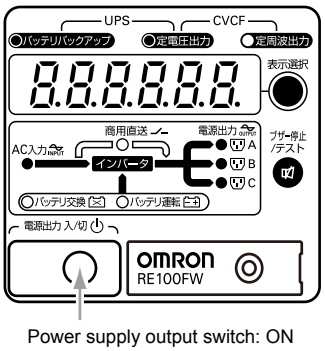
- About 5 seconds after output starts, the self-diagnostic test is performed in Battery Mode for about 10 seconds.

  Bypass: OFF

  (The self-diagnostic test is not performed when battery charge is insufficient.)

Fu 88	The remaining time of the test (seconds) is displayed.

When the above procedure ends normally, operation continues in the state described below.



Power supply output switch: ON

● ON ○ OFF ◐ Blinking

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: OFF

UI 888	Input voltage (V) is displayed.

AC input	: ON
Power supply output	: ON

(3) Put all connected devices into an operational state.
(This includes devices connected to power outlets on the backs of computers or other connected devices.)

Operate the devices in such a way that they are not damaged by a sudden power stop.

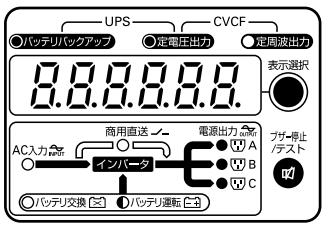
- Make sure that error states with the overload indicator do not occur in this state.
  If normal, operation proceeds with the indicator described in (2) above. → Proceed to (4).
  If the error display appears, refer to “8. Troubleshooting”… on page 66 and respond accordingly.
- The indicator selection switch can be used to display the capacity of connected devices.
  Capacity can be checked in terms of volt-amperes (VA) or watts (W).
  Keep turning ON/OFF the indicator selection switch until one of the following indications is displayed.

UA 888	Indicates the load capacity (VA).
P 888	Indicates the load capacity (W).

- The status indication below blinks when overload occurs.

OL 888	Beep sounds in 0.5-second intervals	Overload Indicates the load rate (%).

(4) Disconnect the unit’s AC input plug from the commercial power source to make it enter Battery Mode.
- The Battery Mode indicator blinks. (The AC input indicator turns OFF while this is occurring.)



Battery Mode : Blinking

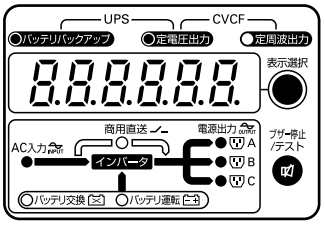
- Does the status indicator match one of the states shown in the table below?
  Status is normal if one of the states below occurs.

Status indicator Battery voltage (V) is displayed.	Beep	Output	Charging	Description
Ub 24.0	Intermittent 4-second intervals	ON	OFF	In Battery Mode due to power outage.
bL 21.0	Intermittent 1-second intervals	ON	ON	In Battery Mode due to power outage, but battery level is low.

  - The indicator details vary according to the battery charge and load capacity. The values shown above are for reference only.
    If the error display appears, refer to “8. Troubleshooting”… on page 67 and respond accordingly.
  - If the UPS and connected devices become unable to perform any backup, an insufficient battery charge may be the cause.
    Connect the AC input plug of the UPS to a wall outlet (commercial power) and wait at least 8 hours for the battery to charge, and then go back to (4).
    If the problem remains after checking the 2 points above, contact the Electronic Systems & Equipments customer support center at: _____.

See also The beep can be turned ON/OFF with setting switch 1 . → Page 49

(5) Reconnect the AC input plug to the commercial power supply.
- The display returns to Commercial Power Mode status, and the beeping sound stops.



● ON ○ OFF

- The operation check of the uninterruptible power supply is complete.

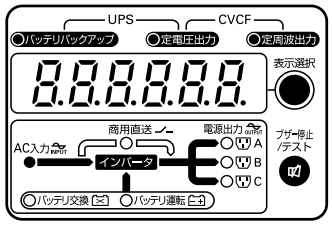
Installation and connection is complete.

Next 3-6. Preparing for operation when using uninterruptible power supply → Page 36

UPS

1-2. Constant frequency (frequency conversion) operation of uninterruptible power supply

(1) After connecting devices such as a PC to the UPS, connect the AC input plug of the UPS to a wall outlet (commercial power).



● ON ○ OFF

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: ON

• Functions that have been set are displayed.

UI 888	Input voltage (V) is displayed.

AC input	: ON

Battery unit charging display	: ON

- Just after the input power supply is turned ON, the status indicator turns ON and displays the details of the error that occurred most recently.
  When there is no record of error, the following is displayed: - -
- Next, the input voltage value is displayed.
  When the indicator blinks, the input voltage value is outside the startup range, so it does not operate when the power supply output switch is turned ON.

(2) Turn ON the unit's power supply output switch.

- The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
- Inverter output begins. (There is no bypass function.)

Bypass: OFF, Power supply output: ON

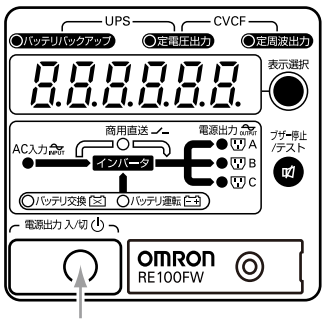
F0 88.8	Output frequency (Hz) is displayed.

- About 5 seconds after output starts, the self-diagnostic test is performed in Battery Mode for about 10 seconds.

Fu 88	The remaining time of the test (seconds) is displayed

(The self-diagnostic test is not performed when battery charge is insufficient.)

- When the above procedure ends normally, operation continues in the state described below.



Power supply output switch: ON

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: ON

F0 88.8	Output frequency (Hz) is displayed.

AC input	: ON
Power supply output	: ON

(3) Put all connected devices into an operational state.
(This includes devices connected to power outlets on the backs of computers or other connected devices.)

Operate the devices in such a way that they are not damaged by a sudden power stop.

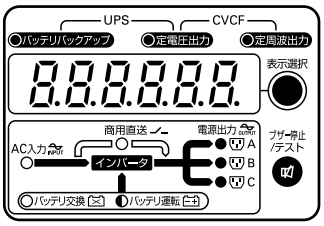
- Make sure that error states with the overload indicator do not occur in this state.
  If normal, operation proceeds with the indicator described in (2) above. → Proceed to (4).
  If the error display appears, refer to "8. Troubleshooting" on page 67 and respond accordingly.
- The indicator selection switch can be used to display the capacity of connected devices.
  Capacity can be checked in terms of volt-amperes (VA) or watts (W).
  Keep turning ON/OFF the indicator selection switch until one of the following indications is displayed.

UA 888	Indicates the load capacity (VA).
P 888	Indicates the load capacity (W).

- The status indication below blinks when overload occurs.

OL 888	Beep sounds in 0.5-second intervals	Overload Indicates the load rate (%).

(4) Disconnect the unit's AC input plug from the commercial power source to make it enter Battery Mode.
- The Battery Mode indicator blinks. (The AC input indicator turns OFF while this is occurring.)



● ON ○ OFF ◐ Blinking

Battery Mode : Blinking

- Does the status indicator match one of the states shown in the table below?
  Status is normal if one of the states below occurs.

Status indicator Battery voltage (V) is displayed.	Beep	Output	Charging	Description
Ub 24.0	Intermittent 4-second intervals	ON	OFF	In Battery Mode due to power outage.
bL 21.0	Intermittent 1-second intervals	ON	OFF	In Battery Mode due to power outage, but battery level is low.

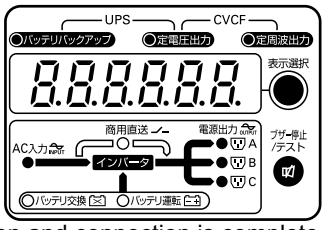
- The indicator details vary according to the battery charge and load capacity. The values shown above are for reference only.
  If the error display appears, refer to "8. Troubleshooting" on page 67 and respond accordingly.

UPS

- If no backup is performed and the UPS and connected devices stop, an insufficient battery charge may be the cause.
  Connect the AC input plug of the UPS to a wall outlet (commercial power) and wait at least 8 hours for the battery to charge, and then go back to (4).
  If the problem remains after checking the 2 points above, contact the Electronic Systems & Equipments customer support center at:_____.

See also The beep can be turned ON/OFF with setting switch 1 . → Page 49

(5) Reconnect the AC input plug to the commercial power supply.
- The display returns to Commercial Power Mode status, and the beeping sound stops.



● ON ○ OFF

- The operation check of the uninterruptible power supply is complete.

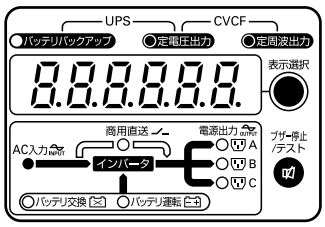
Installation and connection is complete.

Next 3-6. Preparing for operation when using uninterruptible power supply → Page 36

CVCF • AVR

2. Operation check when using as a constant voltage/constant frequency power supply (CVCF) (no battery connection)

(1) The indicator appears as shown below when the AC input plug is connected.



Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: ON

- Functions that have been set are displayed.

UI 888	Input voltage (V) is displayed.

AC input	: ON

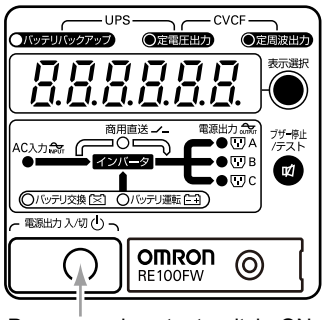
- Just after the input power supply is turned ON, the status indicator turns ON and displays the details of the error that occurred most recently.
  When there is no record of error, the following is displayed: [- -]
- Next, the input voltage value is displayed.
  When the indicator blinks, the input voltage value is outside the startup range, so it does not operate when the power supply output switch is turned ON.

(2) Turn ON the unit's power supply output switch.

- The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
- Inverter output begins. (There is no bypass function.)

Bypass: OFF, Power supply output: ON	
F0 88.8	Output frequency (Hz) is displayed.

- When the above procedure ends, operation continues in the state described below.



Power supply output switch: ON

● ON ○ OFF

Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: ON

F0 88.8	Output frequency (Hz) is displayed.

AC input	: ON
Power supply output	: ON

(3) Put all connected devices into an operational state.
(This includes devices connected to power outlets on the backs of computers or other connected devices.)

- Make sure that error states with the overload indicator do not occur in this state.
  If normal, the operation check is complete.
  If the error display appears, refer to "8. Troubleshooting" on page 67 and respond accordingly.
- The indicator selection switch can be used to display the capacity of connected devices.
  Capacity can be checked in terms of volt-amperes (VA) or watts (W).
  Keep turning ON/OFF the indicator selection switch until one of the following indications is displayed.

UA8888	Indicates the load capacity (VA).
P 888	Indicates the load capacity (W).

- The indication below appears when overload occurs. Reduce the number of connected devices.

OL 888	Beep sounds in 0.5-second intervals	Overload Indicates the load rate (%).

- Installation and connection is complete.

Next 〉 4. Operation → Page 37

UPS

3. Operation check when using cold start operation

(1) Make sure that the SW8 setting switch on the back of the unit is ON.

- If SW8 is OFF, operation cannot occur without commercial input.
- Output frequency is determined according to the SW10 setting switch setting. Check that the desired setting has been made.

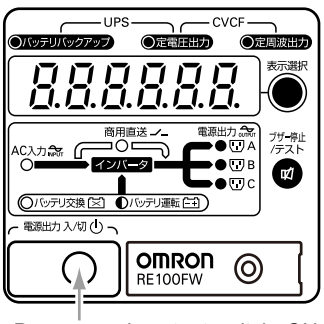
See also “2. Preparing for installation” and “2-2. Settings for use with cold start”

(2) Turn ON the unit’s power supply output switch.

- The beep sounds, and the status indicator turns ON and displays the details of the error that occurred most recently.
  When there is no record of error, the following is displayed: [- -].
  Next, the output voltage setting value and output frequency are displayed in sequence on the status indicator.
- Inverter output begins using power supplied from the battery.

  Battery Mode: ON, Power supply output: ON

- When the above procedure ends normally, operation continues in the state described below.



Power supply output switch: ON

● ON ○ OFF ◐ Blinking

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: ON

- Functions that have been set are displayed.

Ub 23.0	Battery voltage (V) is displayed.
bL 21.0	

Battery Mode	: Blinking
Power supply output	: ON

(3) Put all connected devices into an operational state.
(This includes devices connected to power outlets on the backs of computers or other connected devices.)

Operate the devices in such a way that they are not damaged by a sudden power stop.

- Make sure that error states with the overload indicator do not occur in this state.
- Does the status indicator match one of the states shown in the table below?
  Status is normal if one of the states below occurs.

Status indicator Battery voltage (V) is displayed.	Beep	Output	Charging	Description
Ub 24.0	Intermittent 4-second intervals	ON	OFF	Running in Battery Mode.
bL 21.0	Intermittent 1-second intervals	ON	OFF	In Battery Mode, but battery level is low.

- The indicator details vary according to the battery charge. The values shown above are for reference only.
  If the error display appears, refer to “8. Troubleshooting” on page 67 and respond accordingly.

UPS

- The indicator selection switch can be used to display the capacity of connected devices. Capacity can be checked in terms of volt-amperes (VA) or watts (W).
  Keep turning ON/OFF the indicator selection switch until one of the following indications is displayed.

UA 888	Indicates the load capacity (VA).
P 888	Indicates the load capacity (W).

- The indication below appears when overload occurs. Reduce the number of connected devices.

OL 888	Beep sounds in 0.5-second intervals	Overload Indicates the load rate (%).

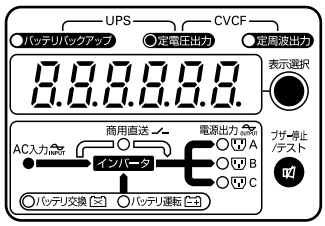
- If no backup is performed and the UPS and connected devices stop, an insufficient battery charge may be the cause. Connect the AC input plug of the UPS to a wall outlet (commercial power) and wait at least 8 hours for the battery to charge, and then go back to (2).
- If the problem remains after checking the 2 points above, contact the Electronic Systems & Equipments customer support center at: _____.
- The cold start operation check is complete.
- Installation and connection is complete.

Next 4. Operation → Page 37

CVCF • AVR

4. Operation check when using as a constant voltage power supply (AVR) (no battery connection)

(1) The indicator appears as shown below when the AC input plug is connected.



Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: OFF

- Functions that have been set are displayed.

UI 888	Input voltage (V) is displayed.

AC input : ON

- Just after the input power supply is turned ON, the status indicator turns ON and displays the details of the error that occurred most recently.
  When there is no record of error, the following is displayed: - -
- Next, the input voltage value is displayed.
  When the indicator blinks, the input voltage value is outside the startup range, so it does not operate when the power supply output switch is turned ON.

(2) Turn ON the unit's power supply output switch.
The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.

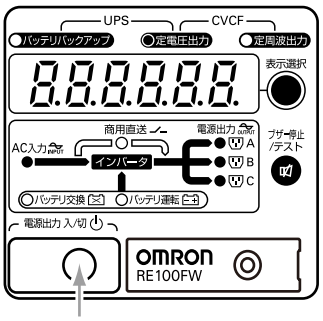
- Output begins with bypass.

Bypass: ON, Power supply output: ON

- The bypass indication lamp turns OFF and inverter output starts.

Bypass: OFF

- When the above procedure ends normally, operation continues in the state described below.



Power supply output switch: ON

Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: OFF

UI 888	Input voltage (V) is displayed.

AC input	: ON
Power supply output	: ON

(3) Put all connected devices into an operational state.
(This includes devices connected to power outlets on the backs of computers or other connected devices.)

- Make sure that error states with the overload indicator do not occur in this state.
  If normal, the operation check is complete.
  If the error display appears, refer to “8. Troubleshooting” on page 67 and respond accordingly.
- The indicator selection switch can be used to display the capacity of connected devices.
  Capacity can be checked in terms of volt-amperes (VA) or watts (W).
  Keep turning ON/OFF the indicator selection switch until one of the following indications is displayed.

UA 888	Indicates the load capacity (VA).
P 888	Indicates the load capacity (W).

- The indication below appears when overload occurs. Reduce the number of connected devices.

OL 888	Beep sounds in 0.5-second intervals	Overload Indicates the load rate (%).

Installation and connection is complete.

Next 4. Operation → Page 37

3-6 Preparing for operation when using as uninterruptible power supply

UPS

1. Charging the battery

When the AC input plug is connected to a wall outlet (commercial power), the battery automatically starts charging, taking up to 12 hours to complete.
(This occurs regardless of whether the power supply output switch is ON or OFF.)

- The unit was charged before shipment, but if it is being used for the first time, the backup time may be reduced due to natural discharge. We recommend charging the unit before use.
- If you do not perform the initial backup time measurement described below in “7. Measuring the initial value of backup time”, proceed to “4. Operation”. → Page 37

2. Measuring the initial value of backup time

- When you measure the backup time initial value of the unit in your environment, this value can be used as a guide when checking the battery and deciding the UPS monitoring software setting values.

See also See also “7. Measuring the backup time”→ Page 65

3. Recharging the battery

The battery is discharged completely when the backup time is measured, so you need to recharge it before using the unit.

- You can use connected devices while recharging the battery, but the backup time when a power failure occurs is shorter until the battery is fully charged.
  (If a power failure occurs immediately after the start of charging, backup stops immediately.)

See also Charge the battery as described above.

Preparation for starting operation is now complete.

Next 4. Operation → Page 37

4. Operation

4-1 Cautions and notes for operation

Cautions and notes for operation are described below.

⚠ Caution (use)

If liquid leaks from the battery, do not touch it.

- Doing so may cause blindness or burns.
- If the liquid touches your eyes or skin, wash it out with lots of clean water and consult your doctor.

If you notice an abnormal sound or smell, smoke or leaking fluid,

UPS case

Immediately turn OFF the UPS power output switch (⏻), and disconnect the AC input plug from the wall outlet (commercial power) and disconnect the battery connector (with Red and Black code) from the UPS rear panel.

CVCF/AVR case

Immediately turn OFF the unit's power output switch (⏻), and disconnect the AC input plug from the wall outlet (commercial power).

- Using the unit under such conditions may cause a ground fault or fire.
- If you notice such conditions, stop using the unit and contact us at _____ for inspection and repairs.
- Use the unit in such a way that you can immediately disconnect the AC input plug from the wall outlet (commercial power) in the event a problem occurs.

Do not place objects on the unit that are 25kg or heavier, and do not drop metal objects onto the unit.

Do not place objects on the unit (except other units when stacking).

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, and may cause a fire.

Do not use the product in a closed place and/or do not cover the product.

- Doing so may cause abnormal heating or a fire.

Do not pour water on the unit and do not allow it to become wet.

- Doing so may cause an electric shock or a fire.
- If the unit becomes wet, immediately stop using it and have it inspected and repaired.

Do not insert metal objects into the unit's output receptacles.

- Doing so may cause an electric shock.

Never touch the metal part of the AC input plug if it is disconnected while the unit isoperating.

- Doing so may result in electric shock.
- The leak current of this product itself is less than the value of the safety standard (leak current: 1 mA). However, because connected equipment causes the leak current to increase, you must never touch the metal part of the AC input plug.
- When the unit is operating, voltage is generated in the metal parts of the AC input plug viacapacitors in the internal circuit, regardless of the elapsed time.

Periodically wipe the AC input plug clean of dirt with a dry cloth.

- Accumulated dust may cause a fire.

⚠ Caution (use)

When the battery replacement lamp is blinking or when the backup time becomes shorter than the required time, immediately stop using the unit and replace the battery pack.

- Continuing to use the unit may cause a fire.
  For more on how to check the battery, see “5. Maintenance and inspection” on page 51.

Ambient temperature	Expected lifespan
20℃	5 to 7years
30℃	3 to 4years
40℃	1 to 2years
50℃	0.7 to 1years

* The values in the table on the left reflect the expected life under standard conditions, andare not guaranteed values.

Notes (UPS)

Do not connect the unit’s AC input plug to a power output receptacle during Battery Mode.

- Doing so may cause the unit to fail.

Before stopping commercial power to the unit, turn OFF the unit’s power supply output switch.

- The unit enters Battery Mode when commercial power is stopped. If you frequently use the unit in Battery Mode, the battery life may be significantly shortened.

This unit uses a lead acid battery.

- Lead acid batteries are a valuable recyclable resource. Please recycle.
  For information about recycling, please contact the OMRONElectronic Systems & Equipments repair Center at: _____.

Explanation (UPS)

Usual operation

- You may either leave the power supply output switch of the unit ON (operation status) or turn it OFF each time when stopping the connected system. Choose whichever operation method is more convenient.
- The battery charges once the unit is connected to commercial power.

Quitting Battery Mode

- If a power failure lasts for an extended period of time, the battery discharges and power supply from the UPS stops. Shut down your computer after performing appropriate procedures (for example, saving data) while the UPS is still supplying power.

Rebooting

- If the battery discharges completely during a power failure, the UPS stops. After recovery from the power failure, the UPS automatically restarts and supplies power. If you do not want the devices connected to the UPS to start up, turn OFF their power switches.
- The automatic restart setting can be disabled with the setting switch on the back of the unit.

Scheduled operation using the UPS monitoring software

- When scheduled operation is used and commercial power supply input is stopped during a scheduled stop period, specify a period of no more than 1 month for the start of the next operation.
  During period that commercial power input is stopped, the timer runs on internal battery power.
  If the timer stops, the operation does not start according to schedule.

Operation start using the UPS monitoring software during scheduled stop

- If the UPS starts operation during a scheduled stop period, turn OFF the power supply output switch once, and then turn it back on again.
  You can start the UPS manually. The schedule is reset once the power supply output switch is turned OFF.

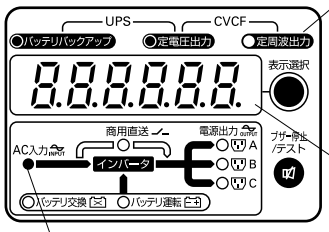
Next **Using as an uninterruptible power supply ... See “4-2. Operation of UPS” → Page 38**
Using as an AC stabilized power supply ... “4-3. Operation of AC stabilized power supply (CVCF)” → Page 45

UPS

4-2 Operation of UPS

1. Basic procedures for operation and stopping

- When connected to commercial power supply and AC input is ON
- When power supply output switch is OFF
  - Power supply output is stopped.



AC input : ON

● ON ○ OFF

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: OFF
	: ON
	(For frequency conversion operation)

UI 888	Input voltage (V) is displayed.

Outside the startup range when blinking.

- The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

- When the input voltage value indicator blinks, the voltage is outside the startup range, so it does not operate when the power output supply switch is turned ON.
- The battery charges automatically.

Battery unit charging display : ON

- Operation startup procedure

(1) For input synchronization operation:
When the uninterruptible power supply (UPS) is used with input/output synchronization operation, the bypass function is available.

Operation Press the power supply output switch to turn it ON.

- The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
- Output begins with bypass.

Bypass: ON, Power supply output: ON

- The bypass indication lamp turns OFF and inverter output starts.

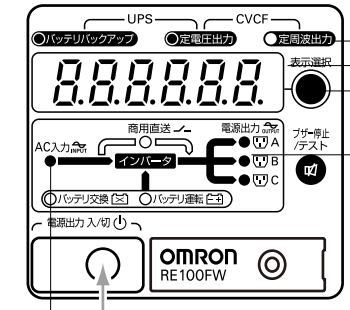
Bypass: OFF

- The output frequency is synchronized with the input frequency.
- About 5 seconds after output starts, the self-diagnostic test is performed in Battery Mode for about 10 seconds.
  The beep does not sound during the test.

Fu 88	The remaining time of the test (seconds) is displayed.

(The self-diagnostic test is not performed when battery charge is insufficient.)

- Next, it enters the commercial operation state described on the next page.
- The battery automatically charges during operation.



● ON ○ OFF

Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: OFF

UI 888	Input voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

Power supply output switch: ON

Power supply outputs A, B, C: ON

AC input : ON

(2) For constant frequency (frequency conversion) operation:
When the uninterruptible power supply (UPS) is used with frequency conversion output, the bypass function is not available.

Operation Press the power supply output switch to turn it ON.

- The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
- Inverter output begins.

Bypass: OFF, Power supply output: ON

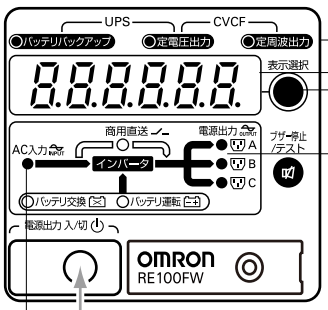
FO 88.8	Output frequency (Hz) is displayed.

- About 5 seconds after output starts, the self-diagnostic test is performed in Battery Mode for about 10 seconds.
  The beep does not sound during the test.

Fu 88	The remaining time of the test (seconds) is displayed.

(The self-diagnostic test is not performed when battery charge is insufficient.)

- Next, it enters the commercial operation state described below.
- The battery automatically charges during operation.



Battery backup	: ON
Constant voltage output	: ON
Constant frequency output	: ON

FO 88.8	Output frequency (Hz) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

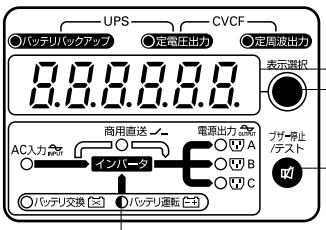
Power supply output switch: ON

Power supply outputs A, B, C: ON

AC input : ON

UPS

- Operation during power outage
  - When a power outage or input power supply error occurs, the unit automatically switches to Battery Mode and power supply output continues using power from the battery.
  - The Battery Mode indicator blinks. (The AC input indicator turns OFF while this is occurring.)
  - As a notification, the beep sounds continuously.
    The status indicator automatically displays the battery voltage.



● ON ○ OFF ◐ Blinking

Ub 22.0 bL 20.5	Battery voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

Battery Mode: Blinking

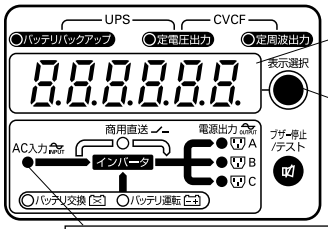
The beep sound can be paused by pressing the beep stop button.

Battery unit charging display: OFF

Status indicator Battery voltage (V) is displayed.	Beep	Output	Charging	Description
Ub 24.0	Intermittent 4-second intervals	ON	OFF	In Battery Mode due to power outage.
bL 21.0	Intermittent 1-second intervals	ON	OFF	In Battery Mode due to power outage, but battery level is low.

* The indicator voltage value decreases as the battery discharges.

- Operation when power is restored
  - When recovery from power outage or input power supply error is made, Commercial Power Mode is automatically restored.
  - The Battery Mode indicator lamp turns OFF and the AC input indicator lamp turns ON.
  - The status indicator shows the input voltage value again and the beeping sound stops.
  - Recharging of the expended battery begins automatically.



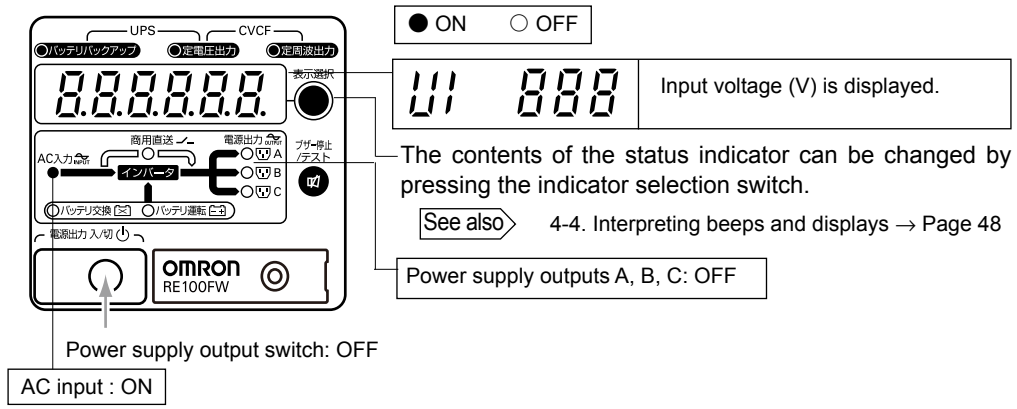
UI 888	Input voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

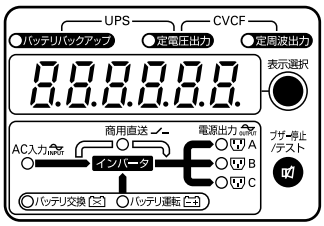
AC input display lamp is ON

- Operation stop procedure
  Operation Press the power supply output switch to turn it OFF.
  - Power supply output stops.
  - If commercial power is supplied even when the power supply output switch is turned OFF, the battery charges automatically.



2. Basic procedures for operation and stopping for cold start operation

- When cold start operation is used, the bypass function is not available.
  - All of the indicators are OFF.
  - Power supply output is stopped.

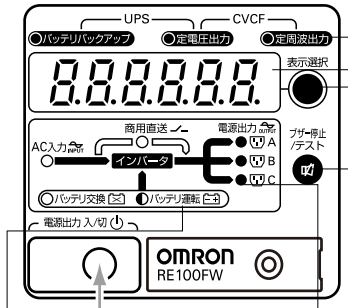


- Operation startup procedure
  Operation Press the power supply output switch to turn it ON.
  - The beep sounds while the status indicator displays the error code of the error that occurred most recently, the output voltage setting value, and the output frequency in order.
  - Power supply output begins using power supplied from the battery.

Battery Mode: Blinking, Power supply output: ON

- The Battery Mode indicator blinks. (The AC input indicator lamp does not turn ON.)
- The beep sounds continuously.
  The voltage value is automatically displayed on the status indicator.

UPS



Power supply output switch: ON

Battery Mode: Blinking

Power supply outputs A, B, C: ON

● ON ○ OFF ◐ Blinking

Battery backup : ON
Constant voltage output : ON
Constant frequency output : ON

Ub 22.0 bL 20.5	Battery voltage (V) is displayed. (“BL” blinks.)

The contents of the status indicator can be changed by pressing the indicator selection switch.

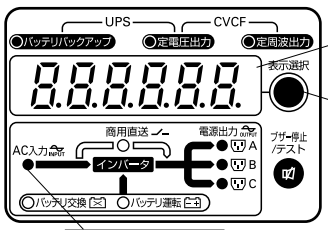
See also 4-4. Interpreting beeps and displays → Page 48

The beep sound can be paused by pressing the beep stop button.

Status indicator Battery voltage (V) is displayed.	Beep	Output	Charging	Description
Ub 24.0	Intermittent 4-second intervals	ON	OFF	Running in Battery Mode.
bL 21.0	Intermittent 1-second intervals	ON	OFF	In Battery Mode, but battery level is low.

* The indicator voltage value decreases as the battery discharges.

- Operation when commercial power supply begins
  - After starting up in Battery Mode, it automatically switches to Commercial Power Mode when input power is supplied.
  - The Battery Mode indicator lamp turns OFF and the AC input indicator lamp turns ON.
  - The status indicator displays the input voltage value and the beeping sound stops.
  - Recharging of the expended battery begins automatically.



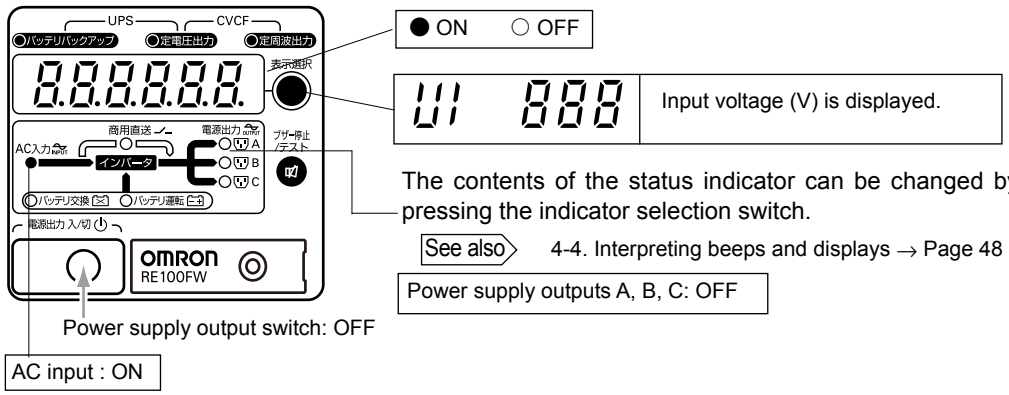
AC input: ON

F0 88.8	Output frequency (Hz) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

- Operation stop procedure
  Operation Press the power supply output switch to turn it OFF.
  - Power supply output stops.
  - When there is no AC input, all of the indicators turn OFF and charging stops.
  - When there is no AC input, and if commercial power is supplied when the power supply output switch is turned OFF, the indicator appears as shown below and the battery charges automatically.



3. Self-diagnosis test

Use the procedure below to check whether a failure has occurred inside the unit and whether battery replacement is required.

The self-diagnostic test is not performed if the battery is not fully charged.

(1) Connect your computer and other devices to the unit and turn ON the power supply output switch.
(2) Press and hold the beep stop/test switch for more than 10 seconds.
Release the beep stop/test switch after the beep sounds. Battery Mode starts for the purpose of testing. (The beep does not sound.) When the test is complete after about 10 seconds, normal operation resumes automatically.
(3) If the status indicator's error display or battery replacement lamp blinks and the beeper sounds:

See also Follow the directions for the solutions described in "4-4. Interpreting beeps and displays" and "5-1. Checking the battery (for UPS only)".

4. Battery auto test

The unit is equipped with functions that automatically check whether battery replacement is required and whether there is a fault in the internal circuit. (You do not have to perform any special operations.)
The test is performed once every 4 weeks after the AC input plug is connected to a wall outlet (commercial power).
The test is not performed if the power supply output switch is OFF or if the battery is not fully charged.

- When the UPS is in continuous operation, the battery test is automatically performed every 4 weeks. If you include the period of time that the commercial power supply to the UPS is stopped, the test is performed each time the total power failure time reaches 4 weeks.
  The 4 weeks includes time when the power supply output switch is OFF, as long as commercial power is supplied to the unit.

UPS

(1) Battery Mode automatically starts when the auto battery test starts. (The beep does not sound.) When the test is complete, normal operation resumes automatically.
(2) If the status indicator displays an error code, the battery replacement lamp blinks, or the beeper sounds:

See also Follow the directions for the solutions described in “4-4. Interpreting beeps and displays/ Displays when there is an equipment failure” and “5-1. Checking the battery (for UPS only)”.

The “disable the auto battery test” setting can be selected with the setting switch on the back of the unit.

See also 4-5 Changing function settings → Page 49
See also “Auto battery test ON/OFF setting”.

- For more on how to replace the battery, see “5. Maintenance and inspection” on page 51.

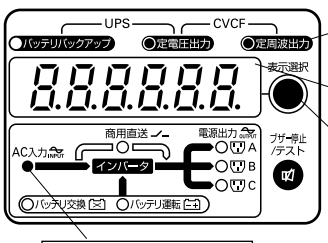
CVCF • AVR

4-3 Operation of AC stabilized power supply (CVCF, AVR)

1. Operation/stop procedures and basic operations when using with constant voltage/constant frequency power supply (CVCF)

When using as a constant voltage/constant frequency power supply (CVCF), the bypass function cannot be used.

- When connected to commercial power supply and AC input is ON
- When power supply output switch is OFF
  - Power supply output is stopped.



AC input : ON

● ON ○ OFF

Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: ON

U1 888	Input voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

- When the input voltage value blinks, the voltage is outside the startup range, so it does not operate when the power output supply switch is turned ON.

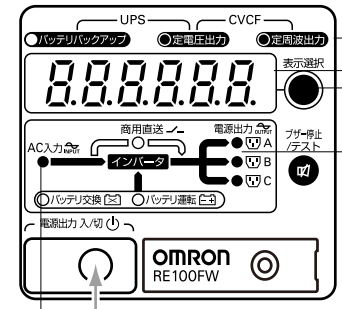
- Operation stop procedure

  Operation Press the power supply output switch to turn it ON.
  - The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
  - Inverter output begins.

Bypass: Always OFF, Power supply output: ON

- The output frequency, which has no relation to the input frequency, matches the frequency selected by the setting switch (SW10).

- Next, it enters the operation state described below.



● ON ○ OFF

Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: ON

F0 88.8 Output frequency (Hz) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

Power supply output switch: ON

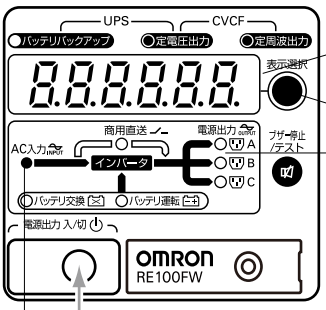
Power supply outputs A, B, C: ON

AC input : ON

- Operation stop procedure

Operation Press the power supply output switch to turn it OFF.

- Power supply output stops.



UI 888 Input voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

Power supply outputs A, B, C: OFF

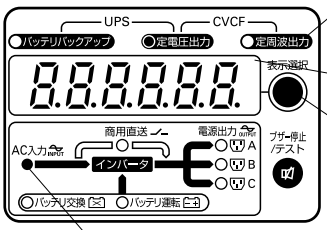
Power supply output switch: OFF

AC input : ON

2. Operation/stop procedures and basic operations when using with constant voltage power supply (AVR)

When used as a constant voltage power supply (AVR), the bypass function is available.

- When connected to commercial power supply and AC input is ON
- When power supply output switch is OFF
- Power supply output is stopped.



Battery backup	: OFF
Constant voltage output	: ON
Constant frequency output	: OFF

UI 888 Input voltage (V) is displayed.

Outside the startup range when blinking.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

AC input : ON

- When the input voltage value blinks, the voltage is outside the startup range, so it does not operate when the power output supply switch is turned ON.

- Operation startup procedure

  Operation Press the power supply output switch to turn it ON.

  - The beep sounds, and the output voltage setting value and output frequency are displayed in sequence on the status indicator.
  - Output begins with bypass.

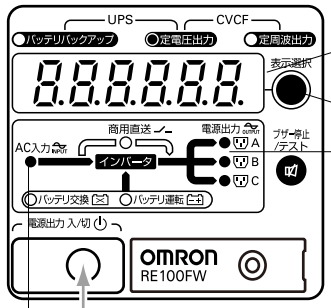
Bypass: ON, Power supply output: ON

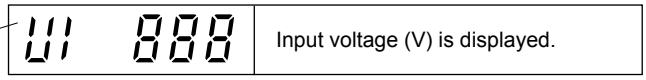
- The bypass indication lamp turns OFF and inverter output starts.

Bypass: OFF

- The output frequency is synchronized with the input frequency.
- Next, it enters the commercial operation state described below.

● ON ○ OFF





Input voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 47

Power supply outputs A, B, C: ON

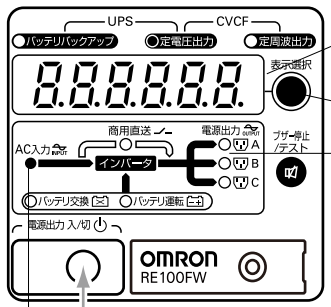
Power supply output switch: ON

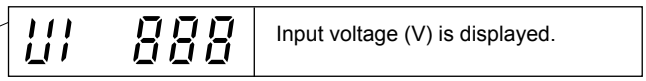
AC input : ON

- Operation stop procedure

  Operation Press the power supply output switch to turn it OFF.

  - Power supply output stops.





Input voltage (V) is displayed.

The contents of the status indicator can be changed by pressing the indicator selection switch.

See also 4-4. Interpreting beeps and displays → Page 48

Power supply outputs A, B, C: OFF

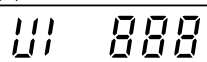
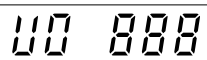
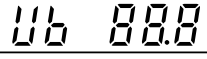
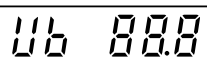
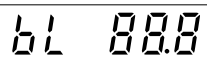
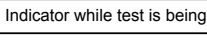
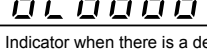
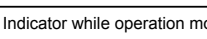
Power supply output switch: OFF

AC input : ON

4-4 Interpreting beeps and displays

Interpreting the status indicator

- When the beep sound occurs, it can be paused by pressing the beep stop button.

No.	Status indicator (Alphabetic+numeric characters)	Beep	Display characters (units)	Description of display
1		–	VI_ ＊ ＊ ＊ (V)	Input voltage When “VI” blinks: Outside the operating range
2		–	VO_ ＊ ＊ ＊ (V)	Output voltage
3		–	FI_ ＊ ＊ . ＊ (Hz)	Input frequency When “FI” blinks: Outside the operating range
4		–	FO_ ＊ ＊ . ＊ (Hz)	Output frequency
5		–	CG_ ＊ ＊ ＊ (%)	Battery charge level (percentage) (when battery is connected and power supply output switch is ON)
6		–	LD_ ＊ ＊ ＊ (%)	Load rate (Power capacity of connected devices)
7		–	VA ＊ ＊ ＊ ＊ (VA)	Load capacity (apparent power) (Volt-amperes)
8		–	P_ ＊ ＊ ＊ (W)	Load capacity (effective power) (Watts)
9		–	VB_ ＊ ＊ . ＊ (V)	Battery voltage (when battery is connected and power supply output switch is ON)
	Indicator when in Battery Mode due to power outage (only when battery is connected)			
10		4-second intervals	VB_ ＊ ＊ . ＊ (V)	Battery voltage
11		1-second intervals	BL_ ＊ ＊ . ＊ (V)	Low battery voltage/low battery level. Output will soon stop.
	Indicator while test is being performed (only when battery is connected)			
12		None	FU__ ＊ ＊ (seconds)	Self-diagnostic test in progress. Displays the amount of time until test is complete.
13		None	BC_ _ _ _ (seconds)	Battery test in progress. Initial stage of test.
14		None	BC ＊ ＊ ＊ ＊ (seconds)	Battery test in progress. Displays the amount of time until test is complete.
	Indicator when there is a device error or warning (“OL”, “REP”, “EO”, “ES”, “EB”, or “EE” blink)			
15		0.5-second intervals	OL_ ＊ ＊ ＊ (%)	Overload
16		Continuous	REP	Fan or battery unit is being replaced without stopping output (only possible when setting switches 8 and 9 are OFF)
17		Continuous	EO	Output stopped due to overload or exceeded time (when no bypass)
18		Continuous	ES	Output stopped due to output short-circuit or overcurrent
19		Continuous	EB	Too many batteries connected
20		Continuous	EE _ _ _ ＊ The ＊ denotes a code number from 1 to 9.	Failure occurred. The number indicates the typeof failure. See also 8. Troubleshooting “EE_* (code number)” explanation (P.67)
	Indicator while operation mode setting is being performed			
21		None	SV_ ＊ ＊ ＊ (V)	Output voltage setting value 100V/110V/115V/120V
22		None	SD_ ＊ ＊ ＊ (seconds)	Power outage signal output delay time setting value

4-5 Changing function settings

1. Using the setting switch to change functions

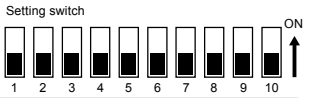
Selection settings 8, 9, and 10 become effective when AC input starts.

Make setting changes while output and AC input are stopped (while the AC input plug is unplugged). Settings are loaded when AC input is ON.

Selection settings 1, 2, 3, 4, 5, 6, and 7 become effective when the power supply output switch is turned ON and output begins.

Make setting changes while the power supply output switch is turned OFF and output is stopped. Settings are read when the power supply output switch is ON.

List of functions using the setting switch
(At factory shipment, all settings are set to OFF.) See also → Page 14



No.	Function to set	OFF side		ON side
1	Beep setting	The beep sounds.		The beep does not sound when in Battery Mode or to indicate a battery replacement warning. The beep sounds when there is a failure or error during operation.
2	Start output with auto-restart when AC input is restored	Auto-restart is performed.		Auto-restart is not performed.
3	ON/OFF setting for auto battery test (enabled only when battery is connected)	Automatically tests battery once every 4 weeks.		Test is not performed.
4	Power supply output stop delay time Sets the time until output stops after BSsignal is input (enabled only when battery is connected) *1	No.4	No.5	
		OFF	OFF	No stop delay
		ON	OFF	60 seconds until stop
5		OFF	ON	120 seconds until stop
		ON	ON	Output does not stop
6	BS signal reception condition setting (enabled only when battery is connected) *1	Output stop is enabled via signal input when in Commercial Power Mode or Battery Mode		Output stop is enabled via signal input only when in Battery Mode
7	Contact signal output BU/NBU (8-pin) selection (enabled only when battery is connected) *1	Outputs power outage signal (BU).		Outputs NBU (reverse logic of BU) signal.
8	Cold start Startup/power supply in Battery Mode (enabled only when battery is connected)	UPS does not start up without AC input.		UPS can start up without AC input.
		Select ON/OFF for the bypass switch according to setting No.9.		Turn OFF the bypass switch on the back of the unit.
9	Input/output frequency synchronization/no n-synchronization switchNot enabled when No.8 is ON	Synchronizes the output frequency and with the input frequency for operation.		Input/output frequency is not synchronized, output frequency is set to 50Hz or 60Hz for operation.
		Turn ON the bypass switch on the back of the unit.		Turn OFF the bypass switch on the back of the unit.
10	Output frequency selection (enabled when No. 8 or No. 9 is ON)	Outputs at 50Hz.		Outputs at 60Hz.

*1: Enabled only when contact signal interface is used.

- When using the contact signal, set the communication selection switch on the back of the unit to “contact”.

2. Operation mode settings

Output voltage settings

	Setting	Status indicator	
Output voltage selection	100V output	“SV 100”	SV 100
	110V output	“SV 110”	SV 110
	115V output	“SV 115”	SV 115
	120V output	“SV 120”	SV 120

- Setting procedure

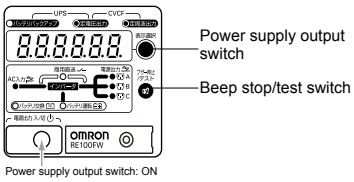
(1) Select the output voltage.

- Turn ON the power supply output switch while pressing the indicator selection switch on the front panel. (Beep sounds for 0.5 second.)
  The status indicator shows “SV ∗ ∗ ∗ ” (Set Voltage), the “current setting for output voltage”.
  Example: “SV 100” is displayed when the current setting is 100V AC.
- Output does not start up at this time.
- When the indicator selection switch is pressed repeatedly, the display changes as shown below.

“SV 100” → “SV 110” → “SV 115” → “SV 120”

(2) Set the output voltage.

- When the beep stop/test switch is pressed while the desired voltage is displayed, the setting value is applied and power supply output starts up.
- The setting value is saved in the UPS, and this setting is used at startup in future operations.



Power outage signal (BU/NBU) output delay time setting

	Setting	Status indicator	
Output delay selection for BU/NBU power outage signal output	No delay	“SD 0”	Sd 0
	Signal output after 0.5 minute	“SD 30”	Sd 30
	Signal output after 1 minute	“SD 60”	Sd 60
	Signal output after 3 minutes	“SD 180”	Sd 180

- Setting procedure

(1) Select the power outage signal output delay time.

- Turn ON the power supply output switch while pressing the beep stop/test switch on the front panel. (Beep sounds for 0.5 second.)
  The status indicator shows “SD ∗ ∗ ∗ ” (Set Signal Delay), the “current setting for signal delay time”.
  Example: “SD 30” is shown when the current setting is for a 30-second delay.
- Output does not start up at this time.
- When the indicator selection switch is pressed repeatedly, the display changes as shown below.

“SD 30” → “SD 60” → “SD 180” → “SD 0”

(2) Set the power outage signal output delay time.

- When the beep stop/test switch is pressed while the desired delay time is displayed, the setting value is applied and power supply output starts up. (Beep sounds for 0.5 second.)
- The setting value is saved in the UPS, and this setting is used at startup in future operations.

5. Maintenance and inspection

⚠ Caution (maintenance)

Do not try to disassemble, repair, or modify the product.
- Doing so may cause an electric shock or a fire.

If liquid leaks from the battery, do not touch it.
- Doing so may cause blindness or burns.
- If the liquid touches your eyes or skin, wash it out with lots of clean water and consult your doctor.

When maintaining connected equipment, turn OFF the unit's power output switch (⏻) and disconnect the AC input plug from the wall outlet (commercial power).
- Make sure the output voltage is stopped before performing maintenance.
- The backup function continues to supply power from the power output receptacles while the UPS is operating, even when the AC input plug is disconnected.
- Power output is supplied at the next scheduled operation start if a scheduled operation is set and the AC input plug is connected to a wall outlet (commercial power).

Do not insert metal objects into the battery connectors.
Do not create a short between the battery connectors.
- Doing so may cause an electric shock.
- Doing so may cause a fire, battery explosion, or burns.

⚠ Caution (battery replacement)

Battery can be replaced while the unit is stopped only.
- When replacing the battery, stop the connected devices, turn off the power supply (UPS) output switch (⏻), and disconnect the AC input plug from the wall outlet.

When performing battery replacement, do not insert metal objects into the battery receptacles.
- Failure to do so may result in an electric shock or short-circuit.

Do not short the battery with metal objects.
- Doing so may result in burns or a fire.
- Some electrical energy remains inside the spent battery.

Do not put the battery into fire.
- The batteries may explode.

Replace batteries only with the same model and brand:
- Battery pack models: BHB60PC: For BHM60PC battery unit (BH60PCW).
  BHB100PC: For BHM100PC battery unit (BH100PCW).
- Manufacturer: OMRON Corporation.
- Using a battery other than that which is specified may cause a fire.

Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the instructions

Do not use a new battery and an old battery at the same time.
- The battery may weaken quickly or leak dilute sulfuric acid.

Do not drop the battery or expose it to strong impact.
- Doing so may cause the battery to leak dilute sulfuric acid.

Do not perform battery replacement in a place where there is flammable gas.
- A spark may occur when connecting the battery, resulting in a fire.

⚠ Caution (battery replacement)

Perform replacement on a stable and flat surface.
- Carefully hold the battery with both hands so that you do not drop it.
- Dropping the battery may result in injury or burns due to leakage (acid).

If liquid leaks from the battery, do not touch it.
- Touching the liquid (dilute sulfuric acid) may cause blindness or burns.

Do not open or mutilate batteries.
- Released electrolyte is harmful to the skin and eyes. It may be toxic.

5-1 Checking the battery (for UPS only)

The sealed lead battery used in the unit has a limited lifespan.
(The lifespan varies depending on the storage/use conditions and the backup frequency.)
Battery deterioration becomes more rapid as it approaches the end of its life.

1. Battery lifespan (estimated timing of replacement)

Average ambient temperature	Battery lifespan	Estimated replacement
20ºC	5 to 7 years	5 years after starting use
30ºC	3 to 4 years	3 years after starting use
40ºC	1.5 to 2 years	1.5 years after starting use
50ºC	0.7 to 1 year	0.5 year after starting use

2. Methods for checking the battery

There are 3 methods for checking the battery.
- Perform a self-diagnostic test. (See page 44.)
- Use the auto battery test function. (See page 44.)
- Measure the backup time. (See page 65.)

By measuring the backup time, the battery life can be determined more accurately.

See also Measure the backup time according to the instructions in “7-1 How to measure backup time”. → Page 65

If the measured value is equal to the “initial value of the backup time” or less than half the value obtained from the “Estimated backup time” graph on page 65, replace the battery.
- When comparing the measured “initial value of the backup time” with the current backup time, ensure that the comparison is accurate by making the capacity of devices connected to the UPS the same as when you measured the initial value.

3. Guidelines for how often to check the battery (measure the backup time)

Average ambient temperature	6-month check	Monthly check
20ºC	For the first 4 years after starting use	When 4 years or more have passed after starting use
30ºC	For the first 2 years after starting use	When 2 years or more have passed after starting use
40ºC	For the first 1 year after starting use	When 1 year or more has passed after starting use
50ºC	For the first 0.5 year after starting use	When 0.5 year or more has passed after starting use

- **The battery deteriorates even if it is stored. The higher the temperature is, the shorter the lifespan becomes.**

5-2 Replacing the battery

⚠ Caution

When the UPS is used in compliance with UL, CE standards, do not replace the battery while in operation (while power is being output). Replacing the battery while in operation does not comply with UL, CE standards.
Replace the battery while UPS operation is stopped.

- Make sure to use a replacement battery pack (sold separately).

UPS model	Replacement battery pack models
• BH60PCW (Battery unit: BHM60PC)	BHB60PC (one battery unit)
• BH100PCW (Battery unit: BHM100PC)	BHB100PC (one battery unit)

- For information on how to replace the battery, read the manual included with the battery unit or replacement battery pack.

5-3 Replacing the fan

⚠ Note

If the fan fails, you can replace it via the front panel of the device while operation is stopped (power supply output switch is OFF) and AC input is OFF (AC cable is disconnected).
- Make sure to use replacement fan model number REF60F (sold separately).

(1) Preparation
Obtain a replacement cooling fan (sold separately).

Model: REF60F

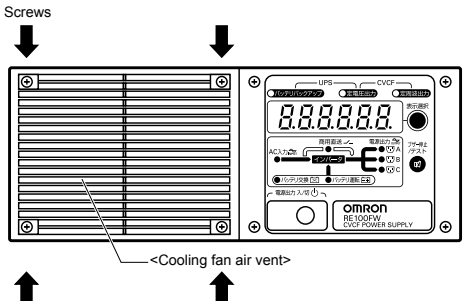
Compatible with the following products:
- UPS (BH60PCW/BH100PCW)
- AC stabilized power supply (RE60FW/RE100FW)

(2) Replacing the fan

1) Before replacing the fan, you must follow the procedure below to stop the unit (UPS/AC stabilized power supply).
   - Stop all connected devices.
   - Turn OFF the unit's power output supply switch to stop the power supply output.
   - Disconnect the AC input plug from the wall outlet (commercial power).

   Make sure all the displays are OFF.

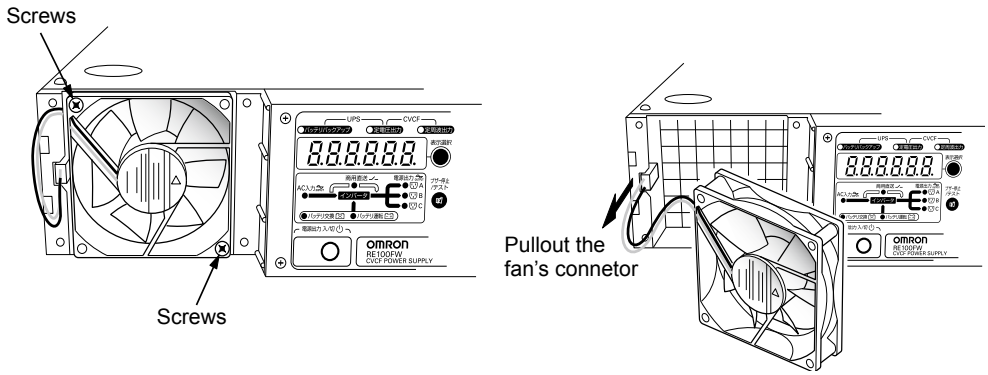
2) Open the front panel and remove the fan.
   - Remove the screws from each of the four corners of the front panel.



- Remove the 2 screws and the fanguard that hold the fan in place and remove the fan. (Save the 2 screws and the fanguard and use them when installing the new fan.)
- Disconnect the fan's connector.

3) Connect the new fan's connector and use the 2 screws to attach the fan to the unit with the fanguard.

4) Attach the front panel.
   - Use the 4 screws to attach the panel.



5-4 Cleaning

- Cleaning the unit
  Moisten a soft cloth with water or detergent, squeeze it tightly, and wipe the unit lightly.
  Do not use chemicals such as thinner or benzene to clean the unit. (Doing so may deform or discolor the unit.)
- Removing dust from the AC input plug
  - Turn OFF the power supply output switch of the unit and all connected devices.
  - Disconnect the AC input plug from the wall outlet (commercial power) and use a dry cloth to remove the dust from the plug.
  - Disconnect the AC input plugs of all connected devices from the unit and clean them.
  - Reconnect the AC input plugs of the connected devices to the unit, and reconnect the unit's AC input plug to the wall outlet.

For more information on how to perform connection:

See also 3. Installation and connection → Page 17

6. Using the UPS monitoring software and contact signal

The UPS monitoring software can be used with UPS models BH60PCW and BH100PCW.

If you do not use the UPS monitoring software or contact signal, you can disregard this section.

- The UPS monitoring software cannot be used with an AC stabilized power supply (RE60FW/RE100FW).

6-1 Selecting the UPS monitoring software

UPS monitoring software selection table

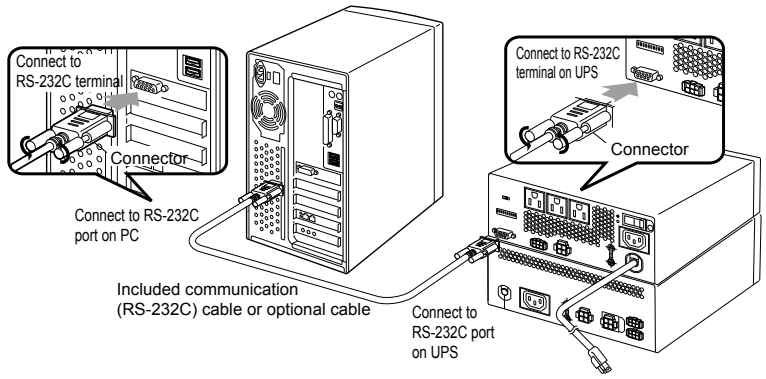
OS	Communication method	UPS monitoring software	Required options (sold separately)
Windows Vista	Serial (RS-232C)	PowerAct Pro (Note 1)	–
Windows Server2003 x64 Edition Windows XP/2000 x64 Edition Windows Server2003	Serial (RS-232C)	PowerAct Pro (Note 1)	–
		UPS service (OS standard) + UPS service driver (included software	–
Windows XP/2000	Contact signal (Note 2) (Note4)	UPS service (OS standard)	BUC26 optional cable
Windows NT4.0	Contact signal (Note 1) (Note2)	UPS service (OS standard)	BUC26 optional cable
Windows Me/98	Serial (RS-232C)	PowerAct Pro (included)	–
Linux	Serial (RS-232C) (Note1)	PowerAct Pro (included)	–

Note 1: Files cannot be automatically saved.
Note 2: To automatically stop the UPS, it may be necessary to change the PC's BIOS settings.
Change the PC's BIOS settings so that the PC's power supply does not automatically cut off after OS shut-down is performed.
Note 3: Even if the UPS does not stop when the OS is shut down, it stops automatically when the battery is depleted.
Note 4: If the connected PC is an NEC PC-9800 series or PC-9821 series computer, use BUC19.
Note 5: For the latest information, check our website at

6-2 Connecting the UPS

Communication interface connection

- Set the communication selection switch on the back of the unit to either "serial" or "contact", according to the communication method in the table above. Diagram on page 49



⚠ Caution

When using this product as a CE marking compliant product, use a connection cable that is 3m or less.

6-3 When using the included UPS monitoring software

To use the software, use the “PowerAct Pro” (Windows/Linux) on the included CD-ROM, and connect the PC to the unit using the following method:

- BH60PCW/BH100PCW (RS-232C connection): Connect using the included communication (RS-232C) cable
- Communication selection switch: Set to “serial”
- “PowerAct PRO” UPS monitoring software included with the BH60PCW/BH100PCW UPS
  Using the included UPS monitoring software allows you to automatically save data files and shut down your computer when a power failure occurs. However, make settings so that the time from the occurrence of the power failure until computer shutdown is less than the maximum backup time. For more details, refer to the instruction manual and online help for the UPS monitoring software.
  The included UPS monitoring software also enables you to use additional functions and scheduled operation.

Explanation

Operation start using the UPS monitoring software during scheduled stop

- If the unit starts operation during a scheduled stop period, turn the power supply output switch OFF once, and then turn it back ON.
  You can start the unit manually.
  In this case, the next scheduled ON operation is cancelled.

Auto restart after OS shutdown by UPS monitoring software

- In the event of a power failure, some PC models (see *1 below) automatically restart immediately after the completion of the OS shutdown processing by the UPS monitoring software.
  In this case, the unit stops during restart or after startup, possibly damaging files and/or the hard disk.
  This problem can be avoided by disabling POWER MANAGEMENT in the BIOS settings.
  *1) PC models: This problem has been reported with MICRON Millenia Mme.
- When the PC does not start up automatically, select the “System startup at power restoration” setting (example: Restore On AC/Power Loss) in the BIOS settings of your PC, and change to a “System startup after power restoration” setting (example: Power On).
  Individual BIOS setting methods and/or displays may differ depending on the PC. For more information, refer to your PC instruction manual or the technical support center for your PC.
- When considering a system with automatic startup at power restoration, choose a PC that satisfies the condition shown below. For more information on PC operation when input power is supplied, consult your PC instruction manual or contact the PC technical support center.

  [Condition]
  Without pressing the power supply output switch, the PC starts up when input power is supplied.
- After shutdown processing in the event of a power failure, the unit restarts automatically and supplies power once power is restored. If you do not want the devices connected to start up, turn OFF their switches.
- The automatic restart setting can be disabled with the setting switch on the back of the unit.

6-4 When using the UPS service

1. When using the UPS service in Windows Server2003/XP/2000

Install the “UPS service driver” that is on the included CD-ROM, and connect to the unit using the method shown below.

- BH60PCW/BH100PCW (RS-232C connection): Connect using the included communication (RS-232C) cable
  When there is a problem with the power supply, files can be saved, applications can be quit, Windows can be shut down, and the UPS can be stopped (shut down).
- Communication selection switch: Set to “serial”

2. When using the Windows NT 4.0 UPS service

When used in combination with an optional cable, the OS standard UPS service can be used.

- DOS/V machine (use a BUC26 optional cable to connect)
- Communication selection switch: Set to “contact”

3. Perform UPS service setup.

<When using the Windows Server 2003/XP/2000 standard UPS service>

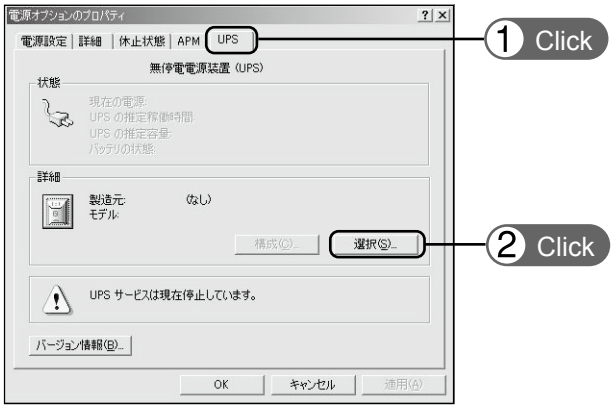
Start up the computer after connecting it with the UPS.

Perform “Log on to Windows” as the Administrator.

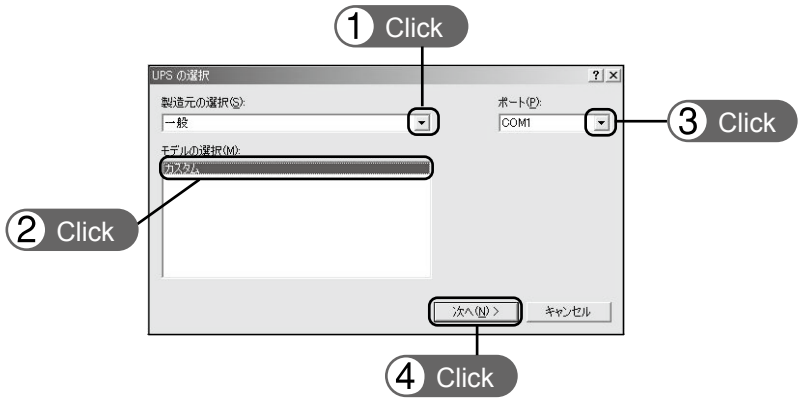
After logging on, follow the instructions below to set up the UPS service.

- How to set up UPS service (shut down Windows when low battery level is detected)

1) Double-click the “Power supply options” icon in Control Panels.
2) Click the “UPS” tab in the power supply options window. Click the “Select (S)” button.



3) Click the button on the right of the “Select manufacturer (S)” window, and select “General” from the list.
Click on “Custom” in the “Select model (M)” window.
Click the button on the right of the “Port (P)” window, and select from the list the port that the UPS is connected to. (In the example screen below, the UPS is connected to COM1.)
Click the “Next (N)” button.



4) In the UPS signal polarity box, click on the boxes to the right of “Power supply failure/battery drive (P)” and “Low battery (L)” signals to insert check marks.
Set the polarity for each signal to “Negative”. Click the “End” button.

5) Click the “OK” button in the power supply options window.
Setup is complete.

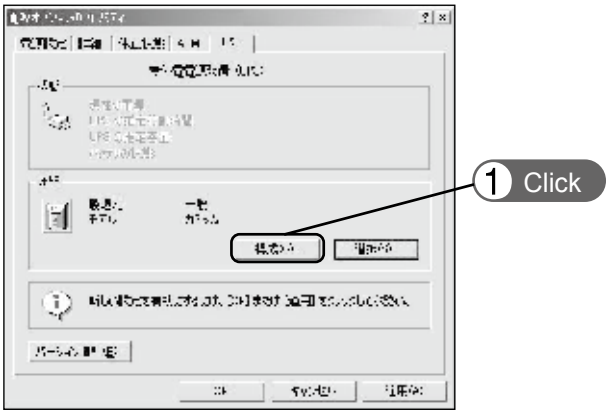
When a power failure occurs, Windows shutdown starts once the low battery voltage signal is detected.

If the power is restored before the low battery voltage signal is detected, Windows shutdown does not start and the normal monitoring state is restored.

Stopping the UPS
In the Windows Server 2003/XP/2000 UPS service, there is no function to stop the UPS. After Windows is shut down, manually turn OFF the unit’s power supply output switch.

<How to set up UPS service (set the time to shut down Windows)>

1) After performing the setup described in the previous section, click the “Configure (C)” button in the power supply options window.



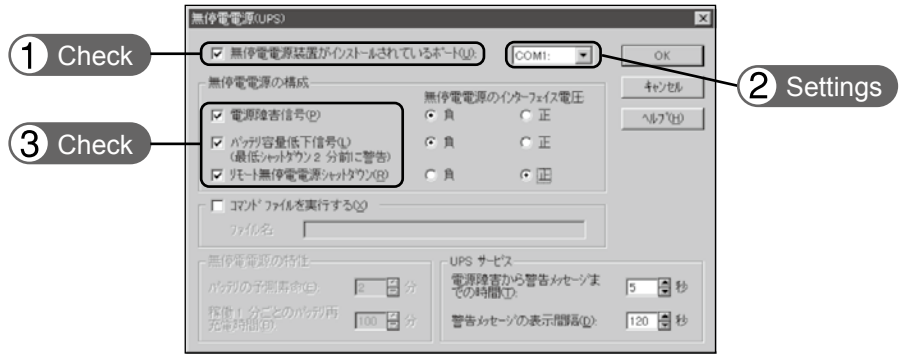
2) In the “Warning” box, place a check mark in the box to the left of “Time from when battery drive starts until warning is issued (M)” by clicking on it.
In the window to the right, set the amount of time to wait before starting Windows shutdown after a power failure occurs. (Setting range: 2 to 720 minutes)
Click the “OK” button.

3) Click the “OK” button in the power supply options window.
Setup is complete.

When a power failure occurs, Windows shutdown starts once the set time is exceeded or the low battery voltage signal is detected.
If the power is restored before the set time is exceeded, Windows shutdown does not start and the normal monitoring state is restored.

<When using the Windows NT standard UPS service>

1) Double-click the “UPS” icon in Control Panels.
2) Insert a check mark in the checkbox to the left of “Port where UPS is installed (U)....” by clicking on it. In the setting field, select the number of the serial port (COM1 to 4) the unit is connected to.
3) Insert check marks in each of the checkboxes to the left of “Power failure signal (P)”, “Low battery level signal (L)”, “Remote uninterruptible power source shutdown signal (R)” by clicking on the boxes.



Set each signal interface voltage setting as shown below.

- Power failure signal (P) ..... Negative
- Low battery signal (L) ..... Negative
- Remote uninterruptible power source shutdown ..... Positive

Note
Please note that in the case of incorrect interface voltage signal settings, Windows NT will not receive the signal from the UPS and the UPS will not stop when there is a power failure. Failure to put check marks in the boxes will lead to the same result.

4) After the settings are made, double-click the “Service” icon in Control Panels.
5) Select the UPS service and click the “Start” button.

By starting the Alerter service, Messenger service, and Event log service in advance, the UPS service sends warning messages to the user and records a history of events such as power failures when they occur.

When a power failure occurs, Windows shutdown is performed once the low battery voltage signal is detected. If the power is restored before the low battery voltage signal is detected, Windows shutdown is not performed and the normal monitoring state is restored.

6-5 Using the contact signal

Based on the following specifications, you can develop your own system for automating the process when there is a power failure.
You can perform power failure and shutdown processing by allowing the system to detect the backup signal and low battery signal, or you can use the trouble signal to perform failure notification.
You can stop the unit by inputting the backup power supply stop signal from the system.
The unit can also be stopped remotely by using the remote ON/OFF signal. Except for remote ON/OFF, the contact signal function is enabled only when the communication selection switch is set to "contact" (See page 47.)

1. Signal output

The unit has 5 types of signal output. The output circuit is an open collector circuit (a type of electronic switch) that uses a photo-coupler.

- Backup signal output (BU)
  Continues during a power failure, and turns ON.
- Backup signal reverse output (NBU)
  Continues during a power failure, and turns OFF.

BU-COM	ON when there is a power failure
NBU-COM	OFF when there is a power failure

NBU is output only when the "communication connector 8 th-pin output signal switching setting" (setting switch 7) is set to ON.

BL-COM	ON when battery is low

- Battery low signal output (BL)
  Turns ON when the battery becomes weak when in Battery Mode.
- Trouble signal output (TR)
  Turns ON when a failure occurs inside the unit.
- Battery replacement signal output (WB)
  Turns ON when the battery needs to be replaced due to deterioration.

TR-COM	ON when a failure occurs

WB-COM	ON when battery deterioration is detected

2. Input of the backup power supply stop signal (BS)

BS-COM	UPS stops

Stops the output of the UPS after the time period specified by the "power output stop delay time setting" (setting switches 4 and 5) has elapsed.

(1) When the backup power supply stop signal setting (setting switch 6) is set to OFF:
The unit's power supply output can be stopped externally by inputting a voltage signal (High) that continues for 0.01 (10 ms) second or more.

(2) When the backup power supply stop signal setting (setting switch 6) is set to ON:
The unit's power supply output can be stopped externally when the stop signal is received only during backup, by inputting a voltage signal (High) that continues for 0.01 (10 ms) second or more.

See also 4-5 Changing function settings Page 49

3. Remote ON/OFF signal

External contact	Operate
Open	Start
Close	Stop

The remote ON/OFF signal can stop and start the unit by means of an externally connected contact or the ON/OFF status of the open collector circuit. To use this function, the power supply output switch of the UPS must be turned ON.
(Note: It is not possible to start up the UPS with the remote ON/OFF signal when there is no AC power supply, even when cold start is set to ON.)

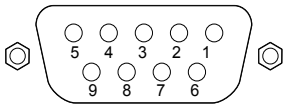
* The remote ON/OFF signal function can be used even when the communication selection switch is set to "serial".

4. Connecting with the system

Make a cable yourself to connect to the system.

See also “8. Signal input/output circuit usage examples” → Page 64

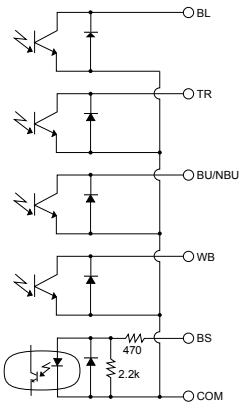
5. Signal input/output connector (DSUB9P female)

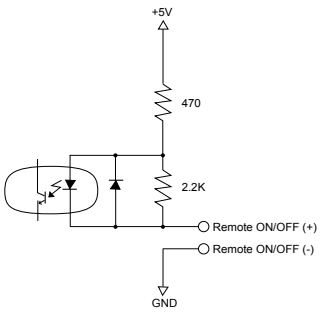
Pin assignment	Pin number	Signal name
 Front view Screw size: Inch screw #4-40UNC	1	BL
	2	TR
	3	BS
	4	–
	5	COM
	6	Remote ON/OFF (+)
	7	Remote ON/OFF (-)
	8	BU/NBU
	9	WB

6. Signal input/output ratings

- Signal output (BL, TR, BU/NBU, WB)
  Photo-coupler ratings
  Applicable voltage: 35 VDC max.
  Maximum current: 10 mA
- Remote ON/OFF
  Voltage between terminals: 5 VDC max.
  Current when closed: 10 mA max.
- Backup power supply stop signal input (BS)
  Input voltage High 5 to 24 VDC
  Low 0.7 VDC max.

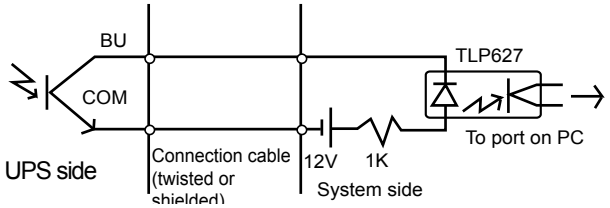
7. Signal input/output circuit inside the unit



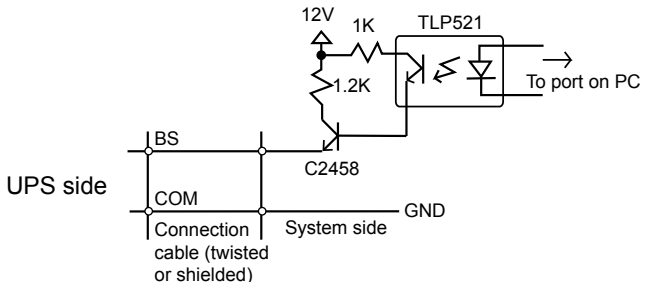


8. Signal input/output circuit usage examples

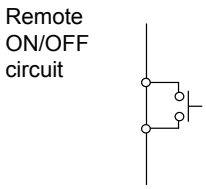
- BU signal usage example



- BS signal usage example



- Remote ON/OFF signal usage example



9. Precautions and notes for using signal input/output

Note
• When connecting a device such as a relay that generates counter electromotive force to the signal output circuit, connect diodes that prevent counter electromotive force to both ends of the relay.

Explanation
• When power is restored after the unit stopped automatically during a power failure, the unit automatically restarts and supplies power. If you do not want to start the connected devices, turn OFF their switches or set the auto restart setting (setting switch 2) to ON. (See page 49.)

7. Measuring the backup time

7-1 How to measure backup time

(1) Connect the unit's AC input plug to a wall outlet (commercial power) and charge for 8 hours.
If the unit has been in operation for more than 8 hours, it is already charged. If a power failure occurs while charging, perform the charging process again.

(2) Turn ON all devices connected to the power supply output receptacle. (This includes devices connected to power outlets on the backs of computers.)
Operate the devices in such a way that they are not damaged by a sudden power stop.

- For Windows Server 2003/Vista/XP/Me/2000/Windos NT/Linux, perform measurement when the hard drive is stopped.
- For Windows 98/95, choose "Shut Down" in Windows and perform the following to shut down your OS:
  Select "Restart in MS-DOS mode" to shut down the OS and display the MS-DOS mode screen.

(3) Disconnect the unit's AC input plug and measure the backup time.
With the plug disconnected, measure the time until the unit automatically stops and all displays disappear.

- The backup time you measure for the first time after purchase is the "initial value of the backup time".

7-2 Estimated backup time

The backup time varies depending on the capacity of connected devices.
After calculating the total capacity of connected devices, refer to the backup time graph to obtain an estimation of the initial value of the backup time.
(This also applies to checking the battery.)

(1) Convert the total capacity (power consumption) of the connected devices to watts (W).
For the indication of connected devices, check you computer and the rear of the display.
The indicator can show values in three different ways: volt-amperes (VA), amperes (A), and watts (W).

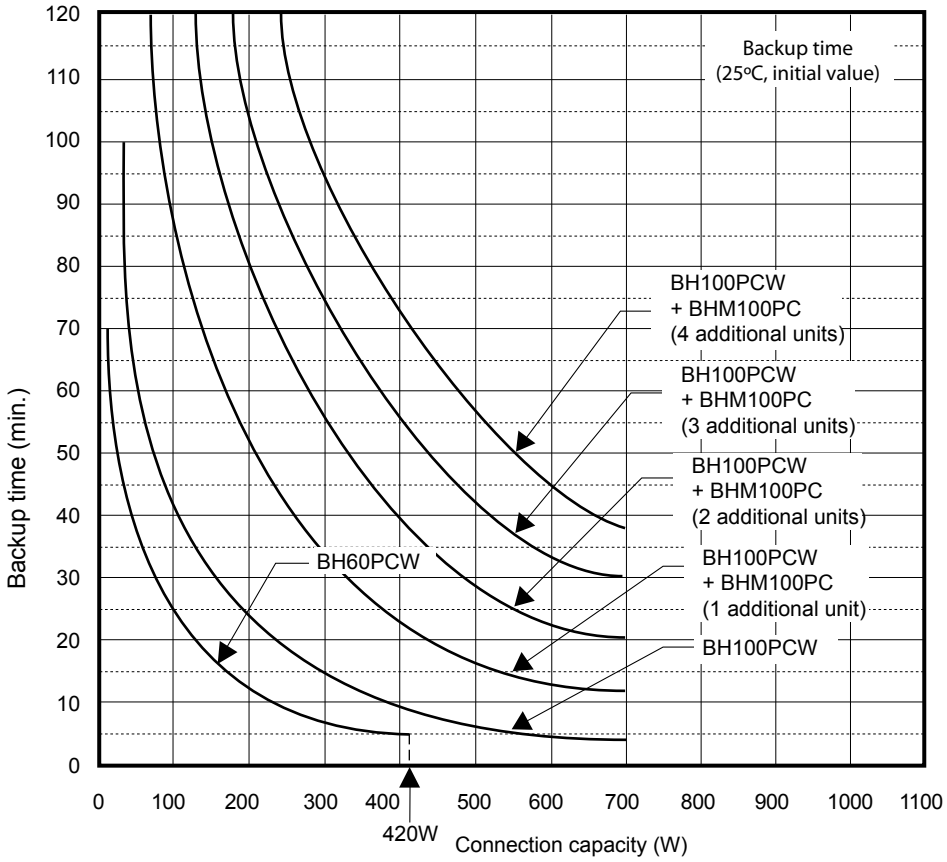
Example 1: 100 VAC, 50/60 Hz, 145 W
Example 2: 100 VAC, 50/60 Hz, 1.8 A
Example 3: 100 VAC, 50/60 Hz, 145 VA

Notation	Value
VA	x power factor = W
A	x power factor x 100 = W

For devices that use VA or A notation, convert the capacity into W. Convert by multiplying the value indicated on devices by the value in the table shown on the right.
(When the power factor is unknown, enter "1". The power factor usually ranges between 0.6 and 1.)

(2) Add the values converted into W to obtain the total capacity of the connected devices.
(3) Use the graph on the next page to calculate the initial value of the backup time for the total capacity of the connected devices.

- Backup time graph (initial values for new products)
- The backup time becomes longer as the capacity of connected devices decreases.



Time unit: Minutes

Model	20W	50W	100W	200W	300W	400W	500W	600W	700W
BH60PCW	65	40	23	13	8	5(420W)	-	-	-
BH100PCW	100	70	45	25	14	10	7	5	4
BH100PCW + BHM100PC (1 additional unit)	210	140	95	50	35	25	19	15	12
BH100PCW + BHM100PC (2 additional units)	320	220	140	80	55	40	30	25	20
BH100PCW + BHM100PC (3 additional units)	430	300	190	110	75	55	45	35	30
BH100PCW + BHM100PC (4 additional units)	550	380	260	140	95	70	55	45	40

- The values in the table above are reference values for the initial state and are not guaranteed values. Times may vary according to battery deterioration and external environmental conditions (temperature, etc.).

8. Troubleshooting

Perform the checks shown below if the unit is operating abnormally.
If the unit continues to operate abnormally, please contact our Electronic Systems & Equipments e customer support center at _____.

Problem	Check/solution
Unit does not operate. The AC input display lamp does not turn ON when the unit's AC input plug is connected to a wall outlet (commercial power).	(1) Make sure the AC input plug is securely connected to commercial power. (2) Is the voltage of the wall outlet (commercial power) too low? Disconnect devices with high power consumption, such as air conditioners. Try connecting to a wall outlet (commercial power) in another room or building. (The unit does not operate at voltages below 85V.) Check the input voltage value ("UI 888 "V) displayed on the status indicator. (3) When not performing cold start, make sure setting switch No.8 is ON. If the problem persists after performing these checks, the unit may have a blown fuse or other problem. Please contact the Omron Electronic Systems & Equipments customer support center at: _____.
Cannot perform backup. The connected devices stop when a power failure occurs.	(1) Is the unit sufficiently charged? Charge the battery for at least 8 hours and perform the test. (You can charge the battery by connecting the AC input plug of the unit to a wall outlet (commercial power).) Make sure the battery unit's charge indicator lamp is ON. Is the battery unit' AC input cable connected to the power outlet receptacle for the AC stabilized power supply's battery unit? If not, the charging circuit does not operate. (2) Are the connection cables (2) for the battery unit and AC stabilized power connected? Open the battery unit's front panel and check the connection. (3) Is the battery connector inside the battery unit connected?
Backup is performed too frequently. Switching is frequently performed even when no power failure occurs. A switching sound can be heard.	(1) There may be an abnormality in the input power supply. Connect the unit to a wall outlet (commercial power) in another room, or another building if possible. Also, try stopping large devices such as air conditioners. (2) Is a page printer (laser printer, etc.) connected? Page printers cannot be used because they draw a large instantaneous current.
The status indicator shows "OL", and the beeper sounds at 0.5-second intervals.	There are too many connected devices. Reduce the number of connected devices until the "OL 888" display turns OFF. Select the "VA8888" and "P 888" displays with the indicator selection switch to check the apparent power (VA: volt-amperes) and power consumption (W: watts) of connected devices. Reduce the number of connected devices so that both values are within the specified output capacity of the UPS or AC stabilized power supply.
The status indicator blinks "E0", and the beeper sounds continuously.	The unit immediately stopped because too many devices were connected for 2 minutes or more, or because the capacity of the connected devices exceeded 130%. Turn OFF all power to the unit and connected devices, and reduce the number of connected devices. Then, turn the power to the unit and connected devices back ON and check whether operation starts up and proceeds as normal.
The battery replacement lamp blinks and the beeper sounds at 2-second intervals.	The battery auto test or self-diagnostic test determined that the battery is dead. Battery Mode cannot be performed properly, so the battery needs to be replaced. If the battery is not replaced before long, backup will become unavailable.

Problem	Check/solution
The following error displays are shown on the status indicator: "E5", "Eb", or "EE 8".	"E5" indicates a short-circuit on the output side or excess incoming current from the connected devices. "Eb" indicates that the number of connected battery units exceeds the maximum number of 5. "EE 8" indicates that an operational error or failure occurred. Check the error code, and contact our Electronic Systems & Equipments customer support center at _____.

EE 8 (code number) explanation

[Solution]

When connected devices are operating with bypass output, turn OFF the power switches of all connected devices and follow the procedure described below.

(1) Perform the troubleshooting provided in the error display section.

(2) When there is commercial input, "UI 888" is restored on the input voltage display.
If the status does not display without restarting, there is a problem with the UPS. Contact the shop of purchase or our Electronic Systems & Equipments customer support center at: _____.

(3) After confirming item 2, turn back ON the unit's power switch while all the connected devices remain stopped.
If, after the power supply output switch is turned ON, the "EE_(number code)" display does not appear and there is no output, there is a problem with the unit. Contact the shop of purchase or our Electronic Systems & Equipments customer support center at: _____.

No.	Status indicator (Error code number)	Output	Beep	Charging (Only when battery is connected)	Power switch	Explanation (Output stops when bypass circuit is set to OFF)	Solution
20-1	EE 1	ON	Continuous	Charging	ON	Excess output voltage detected, bypass output or output stopped	Power supply output switch: OFF
20-2	EE 2	ON	Continuous	Charging	ON	Insufficient output voltage detected, bypass output or output stopped	Power supply output switch: OFF
20-3	EE 3 (Only when battery is connected)	ON OFF	Continuous	Stopped	ON OFF	Excess charge voltage	Power supply output switch OFF → AC input OFF
20-4	EE 4 (Only when battery is connected)	ON OFF	Continuous	Stopped	ON OFF	Insufficient charge voltage Charger malfunction detected	Power supply output switch OFF → AC input OFF
20-5	EE 5	ON	Continuous	Charging	ON	Excess output DC voltage detected, bypass output or output stopped	Power supply output switch: OFF
20-6	EE 6	ON	Continuous	———	ON	Abnormal internal temperature detected, bypass output or output stopped	Power supply output switch: OFF Wait for it to cool down naturally.
20-7	EE 7	ON	Continuous	Charging	ON	DC bus voltage error detected, bypass output or output stopped	Power supply output switch: OFF
20-8	EE 8	ON	Continuous	Charging	ON	Cooling fan malfunction detected, bypass output or output stopped	Power supply output switch: OFF
20-9	EE 9	OFF	Continuous	———	ON	Control function error (CPU error/reset or other malfunction) Bypass output or output stopped	Power supply output switch: OFF

References

A. Specifications

		BH60PCW RE60FW	BH100PCW RE100FW
Method	Operation method	Full-time inverter supply method	
	Output synchronization method	Select between commercial sync or commercial non-sync	
	Cooling method	Forced air cooling	
	Bypass circuit	Automatic bypass switching. No bypass function for CVCF/UPS (frequency conversion output)	
Input	Rated input voltage	100 to 120 VAC	
	Input voltage range	80 ± 2 to 141 ± 2 VAC (90% or less connected load) 85 ± 2 to 141 ± 2 VAC (90% or more connected load)	
	Input frequency	50Hz/60Hz ± 4.5Hz	
	Input current	7A	12A/100V
	Phase	Single phase, two wire	
	Input power factor	> 0.95	
	Input protection	Fuse (built into device)	
	Input protection capacity	10A	15A
Output	Output capacity *1	600VA / 420W	1KVA / 700W
	Rated factor	0.7	
	Switching time	Uninterrupted	
	Output voltage (In Commercial Power Mode)	100 V mode : 100 VAC± 1.5% 110 V mode : 110 VAC± 1.5% 115 V mode : 115 VAC± 1.5% 120 V mode : 120 VAC± 1.5%	
	Output voltage (In Battery Mode)	100 V mode : 100 VAC± 1.5% 110 V mode : 110 VAC± 1.5% 115 V mode : 115 VAC± 1.5% 120 V mode : 120 VAC± 1.5%	
	Output frequency (In Commercial Power Mode)	Synchronous mode: synchronized with an input frequency, Asynchroous mode: frquency 50Hz / 60Hz fixed	
	Phase	Single phase, two wire	
	Output voltage waveform	Sine wave / Sine wave	
	Waveform distortion rate	7% or less (Rectified load at rated output)	
	Output receptacle	NEMA5-15R	
	Number of output receptacles	3 (1 each for A, B, C)	
	Output control *2	(1) Output ON/OFF control (2) Output start delay control Functions for power output supply receptacles B and C only	
Battery BH60PCW/BH100PCW only	Type	Compact sealed lead battery (long-lasting type)	
	Expected lifespan	5 to 7 years (at ambient temperature of 20°C)	
	Capacity (number of batteries)	2 VDC/ 5 Ah (x 12)	2 VDC/ 8 Ah (x 12)
	Backup time	5 minutes (with rated load connected, at 20°C, initial value)	4 minutes (with rated load connected, at 20°C, initial value)
	Number of battery units connected	1	Max. 5
	Charging time	12 hours (80%)	

		BH60PCW RE60FW	BH100PCW RE100FW
Communication interface	Method	(1) RS-232C serial communication (compatible with UPS monitoring soft ware) (2) Contact signal	
	Remote ON/OFF	Output ON/OFF can be controlled by contact signal input	
	Connector type	D-Sub, 9-pin (female)	
Environment	Operating ambient temperature	-10 to +55°C	
	Operating ambient humidity	10 to 90% RH (no condensation)	
	Storage temperature	-20 to 65°C	
	Storage humidity	10 to 90% RH (Store with battery fully charged and with no condensation)	
Other	Dimensions (W× D × H mm)	220 × 84 × 500 / 1 box Battery unit connection for UPS: 2 boxes	
	Weight of unit	6.3kg	6.6kg
	Weight of the battery unit	8.2kg	10.3kg
	Max. internal power consumption		
	(When no battery is connected) With no load With rated load	 80W 100W	 80W 120W
	(When battery is connected) With no load (When 5 battery units are connected) With rated load (When 5 battery units are connected)	 100W – 130W –	 100W 200W 150W 250W
	Safety standard compliance UL 1778	 BH60PCW: Complied RE60FW: None	 BH100PCW: Complied RE100FW: None
	CE	BH60PCW: Complied RE60FW: None	BH100PCW: Complied RE100FW: None
	Noise regulation (compliance standard)	 VCCI Class A	

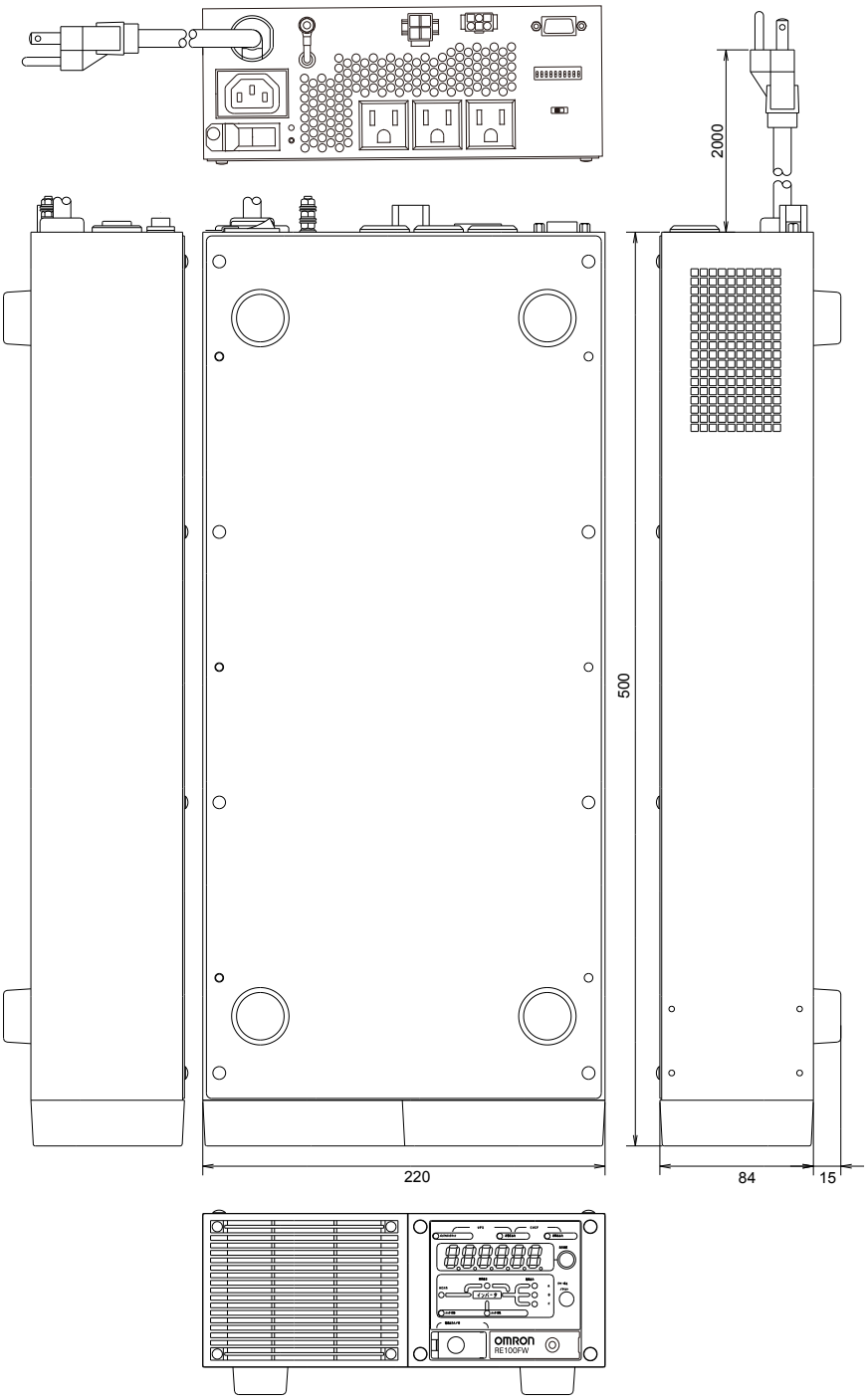
*1: Make sure that both the VA value and the W value of the load capacity connected to the UPS are within the range specified here.

*2: Available only when using the “PowerAct PRO” UPS monitoring software included with the UPS.

B. Dimensions

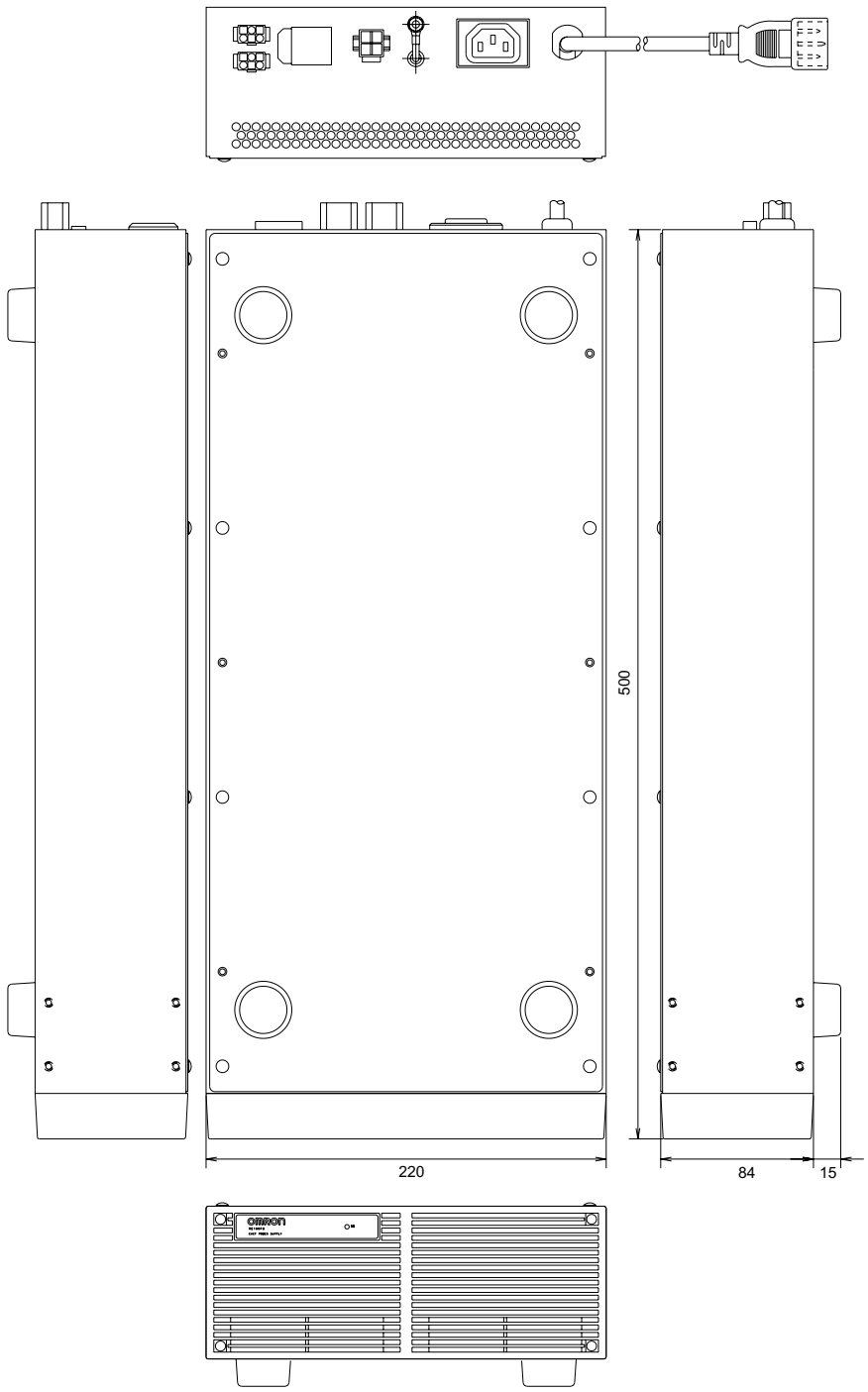
● BH60PCW/BH100PCW (UPS main unit)
● RE100PCW/RE60PCW (AC stabilized power supply)

(unit : mm / Tolerance : ±1mm)

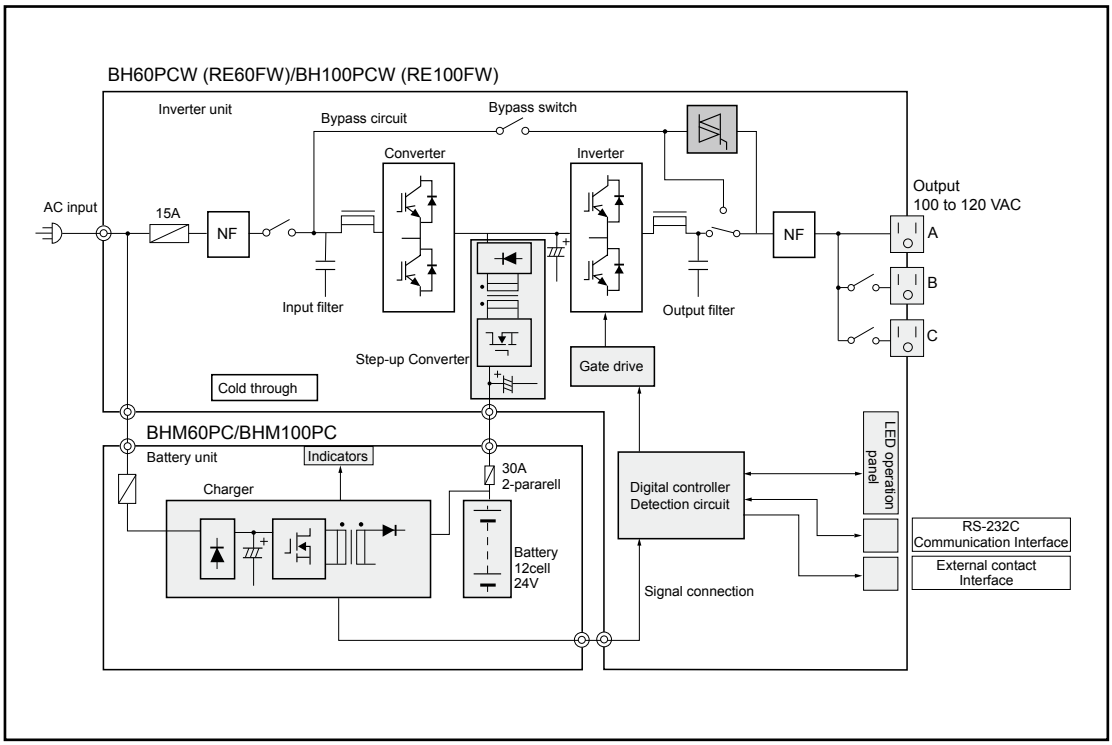


● **BHM100PC/BHM60PC (Battery unit)**

(unit : mm / Tolerance : ±1mm)

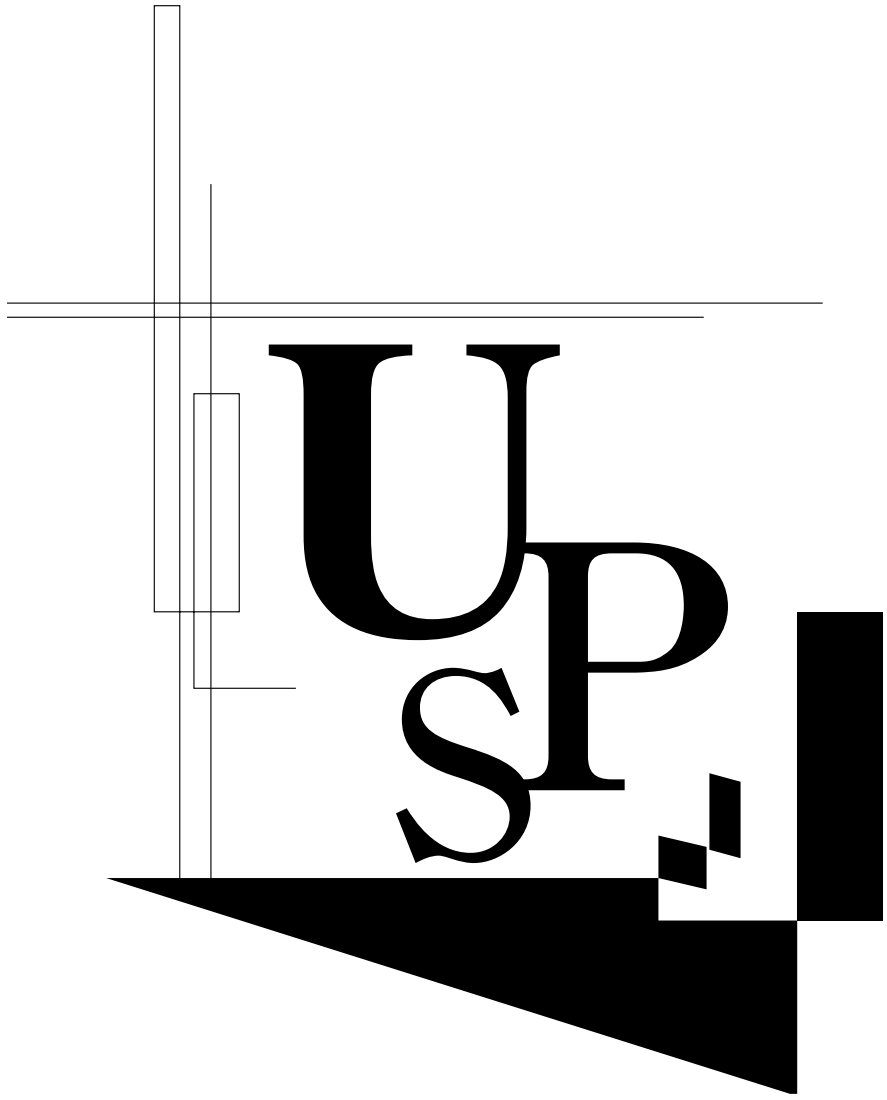


C. Circuit block diagram



D. Related products

	BH60PCW	BH100PCW
Additional battery unit	————	BHM100PC
Replacement battery pack	BHB60PC	BHB100PC
EIA rack-mount bracket	BHP60P	
EIA support angle	BUP06	
JIS rack-mount bracket	BHP60J	
Replacement fan	REF60F	
Contact signal cable	BUC26	



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